CENTRO UNIVERSITÁRIO AUGUSTO MOTTA
Programa de Pós-Graduação *Stricto Sensu* em Ciências da Reabilitação
Doutorado Acadêmico em Ciências da Reabilitação

IGOR MACEDO TAVARES CORREIA

ASSOCIAÇÃO ENTRE "TEXT NECK" E DOR CERVICAL

UM ESTUDO LONGITUDINAL

RIO DE JANEIRO
2024

IGOR MACEDO TAVARES CORREIA

ASSOCIAÇÃO ENTRE “TEXT NECK” E DOR CERVICAL
UM ESTUDO LONGITUDINAL

Tese apresentada ao Programa de Pós-graduação em Ciências da Reabilitação, do Centro Universitário Augusto Motta, como parte dos requisitos para obtenção do título de **Doutor** em Ciências da Reabilitação.

Linha de Pesquisa: Avaliação Funcional em Reabilitação

Orientador: Prof. Dr. Ney Armando de Mello Meziat-Filho

RIO DE JANEIRO
2024

FICHA CATALOGRÁFICA

Elaborada pelo Sistema de Bibliotecas e Informação – SBI – do Centro Universitário Augusto Motta (UNISUAM)

617.53 Correia, Igor Macedo Tavares.

C824a Associação entre “text neck” e dor cervical: um estudo longitudinal / Igor Macedo Tavares Correia. – Rio de Janeiro, 2024.

115 p.

Tese (Doutorado em Ciências da Reabilitação) - Centro Universitário Augusto Motta, 2024.

1. Dor cervical. 2. Dor cervical – Estudo de casos. 3. Postura. 4. Pescoço. 5. Smartphone – Usos e Costumes. I. Título.

CDD 22.ed.

IGOR MACEDO TAVARES CORREIA

ASSOCIAÇÃO ENTRE "TEXT NECK" E DOR CERVICAL

UM ESTUDO LONGITUDINAL

Examinada em: 24/01/2024

Prof. Dr. Ney Armando de Mello Meziat-Filho
Centro Universitário Augusto Motta – UNISUAM

Prof. Dr. Arthur de Sá Ferreira
Centro Universitário Augusto Motta – UNISUAM

Prof. Dr. Leandro Alberto Calazans Nogueira
Centro Universitário Augusto Motta – UNISUAM

Prof. Dr. Thiago da Silva Rocha Paz
Universidade Federal do Rio de Janeiro – UFRJ

Prof. Dr. Tatiana Grasser
Instituto Federal do Paraná - IFPR

RIO DE JANEIRO

2024

Agradecimentos

Agradeço primeiramente a DEUS, sem Ele nada disso seria possível. Pelas oportunidades e desafios concedidos que me fizeram crescer pessoal e profissionalmente.

Ao meu pai (in memorian) que sempre acreditou em mim. Espero que esteja orgulhoso.

À minha esposa, Raiany Pires, pela compreensão e paciência nos momentos que precisei abdicar de outras coisas para chegar até aqui. E não foram poucos momentos. À minha avó, Anita, e meu irmão, Iago, pela força e encorajamento de seguir sempre em frente, vocês são a minha base. Eu amo vocês.

Ao meu orientador, Professor Ney Meziat, pelo apoio incondicional desde o início do mestrado até o final do doutorado. Sempre disponível e compreensivo com um amor pelo que faz inigualável. Obrigado pelas orientações e pela sua amizade.

Aos amigos, à banca, coautores e demais professores do programa que me ensinaram e incentivaram a buscar conhecimento e produzir ciência de forma prazerosa. Espero conseguir passar adiante essa habilidade.

Ao Centro Universitário Augusto Motta (UNISUAM) e ao Programa de Pós-Graduação em Ciências da Reabilitação (PPGCR) pela oportunidade de aperfeiçoamento. Foram 6 anos, entre mestrado e doutorado, onde aprendi, ensinei e fiz belas amizades que me trouxeram até aqui e seguirão ao longo da minha jornada acadêmica e clínica.

“Não fui eu que lhe ordenei? ***Seja forte e corajoso!*** *Não se apavore, nem se desanime, pois o Senhor, o seu Deus, estará com você por onde você andar.” Josué 1:9*

Resumo

Introdução: O “text neck” (TN) é caracterizado pela flexão cervical adotada durante a utilização do smartphone. O objetivo deste estudo foi investigar a associação entre TN e dor cervical (DC) ao longo de um acompanhamento de 12 meses e a influência de fatores psicossociais.

Métodos: É um estudo longitudinal. A amostra foi composta por 457 voluntários sem DC com idade entre 18 e 65 anos. Dados sociodemográficos, antropométricos, de estilo de vida, psicossociais e de uso de smartphones foram coletados por meio de questionário autorreferido. O TN foi avaliado objetivamente no início do estudo, medindo o ângulo de flexão cervical usando o dispositivo de amplitude de movimento cervical (CROM), com os participantes em pé e sentados enquanto enviavam mensagens de texto em seus smartphones. Um ano após a avaliação inicial, os participantes foram avaliados quanto à prevalência pontual e frequência de DC.

Resultados: Do total, 396 (87%) participantes completaram o acompanhamento de um ano. DC foi relatada por 40 (10%) participantes aos 12 meses. A análise de regressão logística múltipla mostrou que o TN não estava associado à DC (OR em pé = 1,0 [0,97–1,04]; OR sentado = 1,01 [0,98–1,04]) ou frequência de DC (OR em pé = 1,01 [0,99–1,03]; sentado OR = 1,00 [0,99–1,02]) 12 meses após o início do estudo. Entretanto, a baixa qualidade do sono (OR = 1,76 [1,17–2,63]) e o nível insuficiente de atividade física (OR = 2,41 [1,03–5,65]) foram associados à DC.

Conclusões: “Text neck” não se associou com DC ou frequência de DC após 12 meses de acompanhamento de adultos inicialmente sem DC, ao contrário da baixa qualidade do sono e nível insuficiente de atividade física.

Palavras-chave: Dor cervical; Postura; Smartphone

Abstract

Background: The “text neck” is characterized by cervical flexion adopted while using the smartphone. The aim of this study was to investigate the association between text neck and neck pain over a 12-month follow-up and the influence of psychosocial factors.

Methods: A longitudinal study. The sample consisted of 457 volunteers without NP aged between 18 and 65 years. Sociodemographic, anthropometric, lifestyle, psychosocial and smartphone use data were collected through a self-reported questionnaire. TN was assessed objectively at baseline by measuring the cervical flexion angle using the cervical range of motion device (CROM) with participants standing and sitting while texting on their smartphones. One year after the initial assessment, participants were assessed regarding the point prevalence and frequency of NP.

Results: Of the total, 396 (87%) participants completed the one-year follow-up. NP was reported by 40 (10%) participants at 12 months. Multiple logistic regression analysis showed that TN was not associated with NP (standing OR = 1.0 [0.97–1.04]; sitting OR = 1.01 [0.98–1.04]) or frequency of NP (standing OR = 1.01 [0 .99–1.03]; sitting OR = 1.00 [0.99–1.02]) 12 months after baseline. However, low sleep quality (OR = 1.76 [1.17–2.63]) and insufficient level of physical activity (OR = 2.41 [1.03–5.65]) were associated with NP.

Conclusions: Text neck was not associated with NP or frequency of NP after 12 months of follow-up of adults initially without NP, contrary to low sleep quality and insufficient level of physical activity.

Keywords: Neck pain; Posture; Smartphone; Text neck.

Lista de Ilustrações

Lista de Quadros e Tabelas

Lista de Abreviaturas e Siglas

CAPES	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
CEP	Comitê de Ética em Pesquisa
CID	Código Internacional da Doença
CROM	*Cervical Range of Motion*
DC	Dor cervical
DP	Desvio padrão
IC	Intervalo de confiança
ODS	Objetivos de Desenvolvimento Sustentável
OMS	Organização Mundial da Saúde
SUS	Sistema Único de Saúde
TCLE	Termo de Consentimento livre e esclarecido
UNISUAM	Centro Universitário Augusto Motta

Sumário

PARTE I – PROJETO DE PESQUISA

Capítulo 1 Revisão de Literatura

1.1 Introdução

A dor cervical (DC) é a quarta causa de incapacidade no mundo e segue crescendo de forma considerável na última década, sendo quase a mesma entre as fases adulta e fim da adolescência (HOY et al., 2014; VOS et al., 2014). A DC é um potencial transtorno de saúde pública, tanto em termos de saúde pessoal e bem-estar geral (DAFFNER et al., 2003), quanto em despesas indiretas (CÔTÉ; CASSIDY; CARROLL, 2001). Além de ser um dos problemas musculoesqueléticos que mais geram custo nas nações industrializadas (MANIADAKIS; GRAY, 2000). A prevalência de dor crônica no pescoço aumentou significativamente entre a população jovem entre 20 e 34 anos nas duas últimas décadas paralelamente ao crescente uso de dispositivos móveis (HOY et al., 2014).

Os *smartphones* tornaram-se essenciais no cotidiano das pessoas por conta da sua utilidade e seus inúmeros recursos. Atualmente, eles são utilizados tanto para trabalho quanto para diversão, troca de mensagens, fotos, jogos e acesso a internet. Por causa da sua utilização frequente em praticamente todas as faixas etárias, levantou-se uma hipótese de que uma postura adotada com o pescoço fletido durante a leitura e digitação no *smartphone* possa contribuir para o aumento da prevalência de DC além de outros sintomas físicos (ARSLAN, A., & TUTGUN ÜNAL, 2013; ARSLAN; ÜNAL, 2013; KORPINEN; PÄÄKKÖNEN, 2009). Essa teoria surgiu com Dean Fishman, médico americano, que cunhou o termo “text neck”, para uma possível síndrome proveniente do uso excessivo do *smartphone*. O *text neck* envolve a cabeça, pescoço e ombros e geralmente ocorre pela tensão postural excessiva ao permanecer com o olhar para frente e para baixo em qualquer dispositivo portátil (KEMP, 2023). Já mais recentemente, uma revisão de escopo (GRASSER et al., 2023) mostrou que a postura de flexão cervical adotada durante o uso do celular é a característica definidora do *text neck*.

Hansraj (2014) publicou um artigo que foi muito disseminado pela mídia, o qual utiliza um modelo computacional calculando o centro de massa e o peso médio

do pescoço e cabeça de acordo com a angulação adotada na flexão cervical, mostrando que quanto maior a angulação maior seria a carga na articulação (HANSRAJ, 2014). Contudo, os autores não avaliaram nenhuma pessoa, o que torna inviável a extrapolação dos dados. A ligação entre a postura do pescoço e dor cervical não é clara (PAKSAICHOL et al., 2012; SILVA et al., 2009; SILVA; SHARPLES; JOHNSON, 2010). Outra sugestão é que a DC esteja associada a mudanças no mecanismo de regulação da dor, ao invés somente da sobrecarga biomecânica na coluna cervical e cintura escapular (MEZIAT-FILHO et al., 2023; RICHARDS et al., 2016).

Um estudo longitudinal, também associou o tempo gasto com mensagens de texto em dispositivos móveis com dores persistentes no pescoço, porém não foi avaliada qual postura era adotada durante o uso do aparelho. Além disso, o mesmo estudo, mostrou que o tempo de uso do celular não aumentou o risco de novos casos de DC, somente dor na mão e dedos (CHO; HWANG; CHEN, 2003; CORREIA; GRASSER; MEZIAT-FILHO, 2022).

Em desafio as fortes crenças, clínica e social, de que uma postura inapropriada do pescoço (CHO; HWANG; CHEN, 2003), durante o envio de mensagens pelo celular, pode ser a principal causa da crescente prevalência de DC, o estudo de Correia e colaboradores (2021) não encontrou tal associação entre adultos após avaliação quantitativa da flexão cervical com inclinômetro CROM nas posições de pé e sentado (CORREIA et al., 2021), assim como Damasceno e colaboradores em estudantes de 18 a 21 anos (DAMASCENO et al., 2018). Bertozzi e colaboradores (2020) também não encontraram associação entre o tempo gasto nos smartphones com DC e incapacidade (BERTOZZI et al., 2021). Porém até o presente momento a maioria dos estudos é de caráter transversal, não havendo dados longitudinais.

1.2 Justificativas

1.2.1 Relevância para as Ciências da Reabilitação

Os aparelhos *smartphones* continuam tomando espaço na vida das pessoas, para troca de mensagens, fotos ou jogos, seja por conta de trabalho, lazer ou cotidiano. O Brasil é considerado um dos países em que a população mais utiliza o celular, em média, o brasileiro gasta 32% do tempo acordado no dia, usando o aparelho. Essa porcentagem aumenta para 56%, aproximadamente 9 horas e 32 minutos, levando em consideração o tempo de tela de celulares e computadores combinados (KEMP, 2023).

Entre os profissionais de saúde ainda persiste a ideia de vulnerabilidade estrutural da coluna como principal causa de dor, onde uma correção postural preveniria possíveis danos teciduais (O'SULLIVAN et al., 2016).

Correia e colaboradores (2021) não encontraram associação entre a postura do pescoço durante o envio de mensagens pelo celular – "text neck" - à DC, em adultos (CORREIA et al., 2021). Entretanto, esse estudo apresentava um delineamento transversal. Avaliar os indivíduos com um acompanhamento à longo prazo se torna importante para esclarecer se o "text neck" é ou não um preditor de dor cervical.

1.2.2 Relevância para a Agenda de Prioridades do Ministério da Saúde[1]

O presente estudo está aderido à Agenda de Prioridades do Ministério Público através do Eixo 5 – Doenças crônicas não transmissíveis, 5.1: avaliações de custos e do impacto econômico no Sistema Único de Saúde (SUS) das doenças crônicas não transmissíveis.

[1] https://bvsms.saude.gov.br/bvs/publicacoes/agenda_prioridades_pesquisa_ms.pdf

1.2.3 Relevância para o Desenvolvimento Sustentável[2]

O presente estudo é de relevância para os Objetivos de Desenvolvimento Sustentável (ODS) através da ODS 3: Saúde e bem-estar, que tem seu foco principal na saúde da população, visando assegurar uma vida saudável, promover saúde e bem estar para todos, em todas as idades, com cobertura de atenção primária à saúde e acesso a serviços de saúde essenciais de qualidade.

1.3 Objetivos

1.3.1 Primário

Analisar a associação entre “text neck” e DC entre indivíduos adultos após um ano da linha de base.

1.3.2 Secundários

1. Analisar a associação entre “text neck” e DC entre indivíduos adultos através de uma avaliação subjetiva de fisioterapeutas experientes.
2. Analisar a associação entre “text neck” e frequência de DC entre indivíduos adultos após um ano da linha de base.
3. Analisar a influência de fatores psicossociais na DC em indivíduos adultos que utilizam *smartphones*.

[2] https://odsbrasil.gov.br/objetivo/objetivo?n=3

1.4 Questionamentos

1. A postura de flexão cervical, adotada durante o uso do *smartphone*, pode causar dor cervical em adultos ao longo do tempo?
2. A postura de flexão cervical, adotada durante o uso do *smartphone*, aumenta a frequência de dor cervical em adultos?
3. Fatores psicossociais podem influenciar na DC em adultos que utilizam *smartphones*?

Capítulo 2 Participantes e Métodos

2.1 Aspectos éticos

Este protocolo de pesquisa foi submetido ao Comitê de Ética em Pesquisa (CEP) do Centro Universitário Augusto Motta (UNISUAM; CAAE: 96291118.1.0000.5235) via Plataforma Brasil (https://plataformabrasil.saude.gov.br) antes da execução do estudo, em consonância com a resolução 466/2012[3]. Todos os participantes assinaram um termo de consentimento livre e esclarecido (TCLE; Apêndice 1) após serem informados sobre a natureza do estudo e do protocolo a ser realizado. O parecer consubstanciado do CEP foi de aprovação do projeto (número de aprovação: 3.030.275) (Anexo 1).

2.2 Delineamento do estudo

É um estudo observacional longitudinal com acompanhamento em 12 meses que seguiu as recomendações das Diretrizes STROBE (*Strengthening the Reporting of Observational Studies in Epidemiology*) (VON ELM et al., 2008).

2.2.1 Local de realização do estudo

Centro Universitário Augusto Motta – UNISUAM, situado na Rua Dona Isabel, 94, Bonsucesso no Rio de Janeiro, RJ, Brasil - CEP 21041-010.

[3] https://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf

2.3 Amostra

2.3.1 Local de recrutamento do estudo

A coleta de dados na linha de base foi realizada entre novembro de 2018 e novembro de 2019 no pátio do campus do Centro Universitário Augusto Motta - UNISUAM, onde foi montada uma tenda com toda estrutura para avaliação dos voluntários participantes. O acompanhamento dos participantes após 12 meses da linha de base foi através de contato telefônico ou redes sociais.

2.3.2 Critérios de inclusão

1. Idade entre 18 e 65 anos;
2. Possuir um ou mais smartphones;
3. Não possuir dor cervical no momento da avaliação.

2.3.3 Critérios de exclusão

1. Cirurgias na coluna;
2. Quaisquer doenças que impedissem o indivíduo de adotar a posição ortostática sem apoio;
3. Indivíduos com comprometimento cognitivo significativo.

2.4 Procedimentos/Metodologia proposta

2.4.1 Avaliação e instrumentos de coleta

Este é um estudo observacional longitudinal com acompanhamento em 12 meses, utilizando um questionário de autopreenchimento e fotografia da postura do participante da pesquisa durante a digitação em seu *smartphone*.

O acompanhamento foi realizado após um ano da linha de base de cada participante da pesquisa, feito através de contato telefônico, via e-mail ou ainda através das redes sociais, todas informações foram fornecidas através do questionário. Foram realizadas duas perguntas, sobre presença (Você está com dor no pescoço hoje? As opções de resposta eram: Sim ou Não.) e frequência de dor cervical (Com que frequência você tem tido dor no pescoço? As opções de resposta eram: Muito frequentemente, Frequentemente, De vez em quando, Raramente ou Nunca.).

Os registros fotográficos foram realizados com um celular Iphone 6S Plus, da marca Apple, com uma resolução da câmera de 12 megapixels, sobre um tripé do modelo WT 3710, nivelado paralelamente ao chão. Esse registro foi feito de corpo inteiro, durante digitação de um texto, previamente definido, porém a avaliação foi apenas da coluna cervical. Foram tomadas duas fotografias de cada voluntário, uma seguida da outra. Os participantes ficaram em ortostase em perfil, onde foram posicionados em local determinado, em uma distância de aproximadamente 2,5 metros, lateralmente ao participante, sendo o tripé posicionado a 80 centímetros de altura do chão, permitindo assim, fotografar o corpo inteiro. Todas as imagens capturadas foram armazenadas no Google Drive, em pastas nomeadas individualmente.

O dispositivo usado para mensurar o grau de angulação da região cervical durante a digitação no smartphone é conhecido internacionalmente como CROM (Cervical Range of Motion), semelhante a um óculos, combinado com um inclinômetro, sendo facilmente aplicável. Sua confiabilidade foi estabelecida por Capuano-Pucci e colaboradores (1991) e Tousignant e colaboradores (2006) (CAPUANO-PUCCI et al., 1991; TOUSIGNANT et al., 2006). O CROM mede o arco de movimento da cervical para flexão e extensão, flexão lateral e rotação usando 3 inclinômetros separados, cada um em um plano, sagital, frontal e transversal, respectivamente. Nós avaliamos apenas o grau de flexão cervical.

Figura 1: CROM. Fonte: Arquivo próprio

O preenchimento do questionário foi realizado no mesmo local do registro fotográfico, anteriormente a ele. Este questionário avaliou a auto-percepção da postura ao celular (DAMASCENO et al., 2018b), a quantidade de tempo que o participante se expõe ao uso do aparelho celular, possíveis déficits visuais, se há preocupação com a própria postura, presença, frequência e intensidade de dor cervical e o impacto da dor cervical na vida destes participantes. Além disso, o questionário conta com uma parte inicial de identificação do participante da pesquisa com questões sociodemográficas (nome, idade e sexo), antropométricas (peso e altura), de estilo de vida (nível de atividade física, tabagismo, qualidade do sono), escala de dependência do smartphone e fatores psicossociais (ansiedade, depressão, isolamento social, catastrofização, cinesiofobia e estresse).

2.4.1.1 Tempo de utilização do smartphone

Para avaliar o tempo de uso do smartphone, foi elaborada na seção do bloco dois a seguinte questão "*Em um dia de semana comum, quantas horas por dia você fica entre leitura, mensagens de texto e jogos em seu celular smartphone?*". Foram oferecidas nove opções de respostas, das quais a primeira começa com "Apenas uso o smartphone para falar" e depois as respostas variam o tempo de utilização do celular de "*Menos de 1 hora por dia*" até "*Cerca de 7 ou mais horas por dia*".

2.4.1.2 Problemas visuais

Esta variável é importante para a coleta, pois a postura do aluno pode ser alterada pelo fato de ele ter comprometimento da acuidade visual sem as devidas correções. Portanto, no bloco dois perguntamos “Você tem problema de vista?”, com opção de resposta “sim” ou “não” e, também “Você tem problema de vista e usa óculos (ou lente de contato)?”, as respostas serão “sim”, “não” ou “uso, mas esqueci”.

2.4.1.3 Preocupação com a postura

Com o interesse em pesquisar a preocupação do participante com sua postura e se ele a considera adequada, o bloco dois foi finalizado com três questões “*Você se preocupa com sua postura corporal?*”, “*Você acha que sua postura é adequada ao digitar um texto ao celular?*” e “*Você se preocupa com sua postura ao celular quando digita um texto?*” as opções de respostas foram do tipo *Likert* “muito frequentemente”, “frequentemente”, “de vez em quando”, “raramente” e “nunca”.

2.4.1.4 Classificação da dor cervical

O bloco três do questionário aborda a dor musculoesquelética na região cervical. Foi apresentado o mapa corporal com a região cervical destacada, onde o relato de dor foi coletado através de quatro perguntas do questionário aplicado. Este foi elaborado com informações sobre a presença, frequência e intensidade da DC (LAURIDSEN; HESTBAEK, 2013). Para a coleta de presença e frequência foram usadas duas questões, a primeira “*Você já teve dor no pescoço hoje?*” com as seguintes opções de respostas “*sim*” ou “*não*” e a segunda, “*Com que frequência você tem tido dor no pescoço?*”, as opções de respostas serão do tipo *Likert* “*muito frequentemente*”, “*frequentemente*”, “*de vez em quando*”, “*raramente*” e “*nunca*”.

2.4.1.5 Impacto da dor cervical

No bloco quatro, foram coletadas informações sobre o impacto da dor cervical na vida dos participantes, com os seguintes questionamentos “*Já faltou o trabalho por dor no pescoço?*”, “*Dor no pescoço já te tirou de uma prática esportiva?*” e “*Você já foi a um médico ou fisioterapeuta por causa de dor no pescoço?*” e para

todas estas perguntas foram dadas as seguintes opções de respostas do tipo Likert “muito frequentemente”, “frequentemente”, “de vez em quando”, “raramente” e “nunca”.

2.4.1.6 Escala de dependência do *smartphone*

A escala de dependência do *smartphone*, versão curta, traduzida para o português, compreende dez perguntas com seis opções de respostas, pontuadas de acordo com uma escala Likert: *discordo fortemente = 1, discordo = 2, discordo pouco = 3, concordo pouco = 4, concordo = 5, concordo fortemente = 6* (Apêndice 3). Desta forma, a pontuação total varia de 10 (mínimo) a 60 (máximo), com a pontuação mais alta sendo uma maior chance de dependência do *smartphone* (MESCOLLOTTO et al., 2019). Kwon et al. (2013), definiram a nota de corte para homens em 31 e mulheres 33 pontos (KWON et al., 2013).

2.4.1.7 Variáveis psicossociais

As variáveis ansiedade, isolamento social, catastrofização, depressão, medo e estresse, foram avaliadas mediante aplicação de um breve questionário psicossocial, com base na validação de Kent et al. (2014). Foram 9 questões divididas da seguinte forma, 1 sobre ansiedade; *“Você se sente ansioso?”,* 1 sobre isolamento social; *“Você se sente socialmente isolado?”,* 2 sobre catastrofização; *“Quando sinto dor, é terrível e sinto que nunca vai melhorar.”* e *“Quando sinto dor, sinto que não aguento mais.”*, 2 sobre depressão; *“Durante o mês passado, você se sentiu frequentemente incomodado por se sentir triste, deprimido ou teve uma sensação de desesperança.”* e *“Durante o mês passado, você se sentiu frequentemente incomodado por ter pouco interesse ou prazer em fazer as coisas.”,* 2 sobre medo; *“A atividade física pode prejudicar meu pescoço.”* e *“Eu não deveria realizar atividade físicas que poderiam fazer a minha dor piorar.”* e 1 sobre estresse; *“Você se sente estressado?”.* Cada questão tinha opção de resposta de 0 (não de modo algum, nunca faço isso, nunca, discordo completamente e não estressado) a 10 (bastante, sempre faço isso, o tempo todo, concordo completamente e muito estressado).

2.4.1.8 Variáveis de estilo de vida

O estilo de vida foi avaliado através do Questionário Internacional de Atividade Física (IPAQ), versão curta, aplicado juntamente aos questionários anteriores. O IPAQ foi inicialmente proposto por um grupo de trabalho de pesquisadores durante uma reunião científica em Genebra, Suíca, em abril de 1998. Validado no Brasil, esse questionário divide a atividade física em três níveis; caminhada, atividade moderada e atividade vigorosa, citando exemplos de cada graduação. Em seguida, de acordo com a frequência semanal e carga horária diária de atividades, em cada nível, classifica o indivíduo em; sedentário, insuficientemente ativo, ativo ou muito ativo (MATSUDO et al., 2001; PITANGA, 2004). O tabagismo também foi avaliado como fator contribuinte ao estilo de vida. Através do questionamento *"Nos últimos 30 dias, em quantos dias você fumou cigarro?"* com oito opções de respostas que variavam entre *"nunca fumei"* até *"todos os dias nos últimos 30 dias".* A qualidade do sono foi avaliada com a seguinte pergunta: *"Você teve problemas para dormir no último mês?"* tendo quatro opções de resposta *"nada, um pouco, alguns ou sério".*

2.5 Desfechos

2.5.1 Desfecho primário

A presença de dor cervical avaliada 12 meses após a avaliação inicial com aplicação do questionário e registro fotográfico.

2.5.2 Desfecho secundário

A frequência de dor cervical avaliada um ano após a avaliação inicial com aplicação do questionário e registro fotográfico.

2.6 Análise dos dados

2.6.1 Tamanho amostral (cálculo ou justificativa)

A amostra foi composta por 457 voluntários sem dor cervical com idades entre 18 e 65 anos de ambos os sexos. Essa amostra foi parte de um outro estudo transversal com 582 participantes com e sem DC, realizado no Mestrado (Anexo 2).

2.6.2 Variáveis do estudo

As principais variáveis do estudo foram presença e frequência de dor cervical.

Variáveis numéricas: Idade (em anos), peso (em quilogramas), altura (em centímetros).

Variáveis categóricas: tabagismo, sexo, escala de dependência do *smartphone*, ansiedade, depressão, isolamento social, catastrofização, cinesiofobia e estresse.

Variáveis ordinais: nível de atividade física e qualidade do sono.

2.6.3 Plano de análise estatística

Todas as análises foram realizadas na versão 0.99.486. do RStudio (https://posit.co) e 4.3.2 do R (https://www.r-project.org). As características dos participantes foram descritas por meio de proporções, médias e desvios padrão. Foram realizados quatro modelos de regressão logística. Os dois primeiros avaliaram o pescoço em pé, variáveis psicossociais (ansiedade e depressão) e variáveis de estilo de vida (nível de atividade física e qualidade do sono) como variáveis independentes, com prevalência de dor cervical e frequência de dor cervical como variáveis dependentes, respectivamente. Os dois segundos avaliaram o pescoço sentado e as mesmas variáveis psicossociais e de estilo de vida como variáveis

independentes com as mesmas variáveis dependentes. Potenciais fatores de confusão incluíram idade, sexo, tempo de uso do aparelho, dependência de telefone celular foram incluídos nos modelos de regressão logística de acordo com o que a literatura descreve como potenciais fatores de risco para dor cervical e variáveis relacionadas ao uso de smartphone. O nível de significância adotado no estudo foi de 5%.

2.6.4 Disponibilidade e acesso aos dados

Os dados adquiridos para este estudo serão disponibilizados publicamente, juntamente à publicação dos resultados encontrados.

2.7 Resultados esperados

Do total, esperamos um acompanhamento de pelo menos 85% da amostra. A diferença das médias do ângulo de flexão cervical dos participantes, durante o uso do smartphone, nas posturas em pé e sentado, ser de até 5º. Análise de regressão logística múltipla mostrando que o ângulo de flexão cervical dos participantes em pé e sentado usando um celular não se associa com DC ou frequência de DC um ano após a linha de base. Avaliação dos potenciais confundidores relacionados ao uso dos smartphones e DC.

2.8 Orçamento e apoio financeiro

Este estudo é financiado pela Fundação Carlos Chagas Filho de Apoio à Pesquisa do Estado do Rio de Janeiro (FAPERJ, No. E-26/210.239/2018, No. E-26/211.104/2021, No. 201.357/2022) e pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Código Financeiro 001, No. 88881.708719/2022-01, e No. 88887.708718/2022-00).

Quadro 1: Apoio financeiro.

CNPJ	Nome	Tipo de Apoio financeiro	E-mail	Telefone
00889834/0001-08	CAPES	Bolsa	prosup@capes.gov.br	(061) 2022-6250

Quadro 2: Detalhamento do orçamento.

Identificação do orçamento	Tipo	Valor (R$)
Impressão dos questionários	Custeio	R$1000,00
Banner, tripé e canetas	Custeio	R$300,00
Inclinômetro CROM – Cervical Range of Motion	Material permanente	R$5000,00
	Total em R$	**R$6300,00**

2.9 Cronograma

Quadro 3: Cronograma de execução.

	ETAPA	INÍCIO	FIM
Projeto de Pesquisa	Elaboração do projeto de pesquisa	01/20	02/20
	Exame de Qualificação	05/23	05/23
	Apreciação do Comitê de Ética em Pesquisa	08/18	09/18
	Elaboração de manuscrito (protocolo e/ou revisão)	01/23	06/23
	Submissão de manuscrito	12/23	02/24

Coleta de Dados	Treinamento dos procedimentos e/ou estudo piloto	02/20	02/20
	Modelagem do banco de dados	2019	2020
	Coleta e tabulação de dados	2018	2019
	Análise dos dados	2019	2021
	Elaboração de manuscrito	06/23	01/24
Produção	Submissão de relatório para o Comitê de Ética	2018	2018
	Elaboração do trabalho de conclusão	03/23	12/23
	Exame de Defesa	01/24	01/24
	Submissão de manuscrito (resultados)	05/23	12/23
	Elaboração de mídias para disseminação	2021	2023
	Entrega da versão final do trabalho de conclusão	01/24	01/24

Referências

ARSLAN, A., & TUTGUN ÜNAL, A. Examination of cell phone usage habits and purposes of education faculty students<p>Eğitim fakültesi öğrencilerinin cep telefonu kullanım alışkanlıkları ve amaçlarının incelenmesi. Journal of Human Sciences, 10(1), 182-201. 2013.

ARSLAN, A.; ÜNAL, A. T. Examination of cell phone usage habits and purposes of education faculty students. **Journal of Human Sciences**, v. 10, n. 1, p. 182–201, 15 jan. 2013.

BERTOZZI, L. et al. Posture and time spent using a smartphone are not correlated with neck pain and disability in young adults: A cross-sectional study. **Journal of bodywork and movement therapies**, v. 26, p. 220–226, 1 abr. 2021.

CAPUANO-PUCCI, D. et al. Intratester and intertester reliability of the Cervical Range of Motion device. **Archives of Physical Medicine and Rehabilitation**, v. 72, n. 5, p. 338–340, 1 abr. 1991.

CHO, C.-Y.; HWANG, I.-S.; CHEN, C. C. The Association Between Psychological Distress and Musculoskeletal Symptoms Experienced by Chinese High School Students. **Journal of Orthopaedic & Sports Physical Therapy**, v. 33, n. 6, p. 344–353, jun. 2003.

CORREIA, I. M. T. et al. Association Between Text Neck and Neck Pain in Adults. **Spine**, v. 46, n. 9, p. 571–578, 1 maio 2021.

CORREIA, I. M. T.; GRASSER, T.; MEZIAT-FILHO, N. Letter to the Editor concerning “Neck pain associated with smartphone overuse: cross-sectional report of a cohort study among office workers” by Derakhshanrad N, et al. (Eur Spine J. 2020 doi: 10.1007/s00586-020-06640-z). **European spine journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society**, v. 31, n. 10, p. 2824–2825, 1 out. 2022.

CÔTÉ, P.; CASSIDY, J. D.; CARROLL, L. The treatment of neck and low back pain: who seeks care? who goes where? **Medical care**, v. 39, n. 9, p. 956–967, set. 2001.

DAFFNER, S. D. et al. Impact of neck and arm pain on overall health status. **Spine**, v. 28, n. 17, p. 2030–2035, 1 set. 2003.

DAMASCENO, G. M. et al. Text neck and neck pain in 18-21-year-old young adults. **European spine journal : official publication of the European Spine Society, the**

European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society, v. 27, n. 6, p. 1249–1254, 1 jun. 2018.

GRASSER, T. et al. Defining text neck: a scoping review. **European spine journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society**, v. 32, n. 10, p. 3463–3484, 1 out. 2023.

HANSRAJ, K. K. Assessment of stresses in the cervical spine caused by posture and position of the head. **Surgical Technology International**, v. 25, p. 277–279, 1 nov. 2014.

HOY, D. et al. The global burden of neck pain: estimates from the global burden of disease 2010 study. **Annals of the rheumatic diseases**, v. 73, n. 7, p. 1309–1315, 2014.

KEMP, S. **Digital 2023: Global Overview Report**. Disponível em: <https://datareportal.com/reports/digital-2023-global-overview-report>. Acesso em: 31 maio. 2023.

KORPINEN, L. H.; PÄÄKKÖNEN, R. J. Self-report of physical symptoms associated with using mobile phones and other electrical devices. **Bioelectromagnetics**, v. 30, n. 6, p. 431–437, 2009.

KWON, M. et al. The Smartphone Addiction Scale: Development and Validation of a Short Version for Adolescents. **PLOS ONE**, v. 8, n. 12, p. e83558, 31 dez. 2013.

MESCOLLOTTO, F. F. et al. Translation of the short version of the Smartphone Addiction Scale into Brazilian Portuguese: cross-cultural adaptation and testing of measurement properties. **Brazilian journal of physical therapy**, v. 23, n. 3, p. 250–256, 1 maio 2019.

MEZIAT-FILHO, N. et al. Comment on: Text neck misdiagnosed as fibromyalgia. **Rheumatology**, v. 62, n. 6, p. e199–e200, 1 jun. 2023.

O'SULLIVAN, P. et al. Unraveling the complexity of low back pain. **Journal of Orthopaedic and Sports Physical Therapy**, v. 46, n. 11, p. 932–937, nov. 2016.

PAKSAICHOL, A. et al. Office workers' risk factors for the development of non-specific neck pain: a systematic review of prospective cohort studies. **Occupational and environmental medicine**, v. 69, n. 9, p. 610–618, set. 2012.

RICHARDS, K. V. et al. Neck Posture Clusters and Their Association With Biopsychosocial Factors and Neck Pain in Australian Adolescents. **Physical therapy**, v. 96, n. 10, p. 1576–1587, 1 out. 2016.

SILVA, A. G. et al. Head posture and neck pain of chronic nontraumatic origin: a comparison between patients and pain-free persons. **Archives of physical medicine and rehabilitation**, v. 90, n. 4, p. 669–674, abr. 2009.

SILVA, A. G.; SHARPLES, P.; JOHNSON, M. I. Studies comparing surrogate measures for head posture in individuals with and without neck pain. **Physical Therapy Reviews**, v. 15, n. 1, p. 12–22, 1 fev. 2010.

TOUSIGNANT, M. et al. Criterion validity study of the cervical range of motion (CROM) device for rotational range of motion on healthy adults. **The Journal of orthopaedic and sports physical therapy**, v. 36, n. 4, p. 242–248, 2006.

VON ELM, E. et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. **Journal of clinical epidemiology**, v. 61, n. 4, p. 344–349, abr. 2008.

VOS, T. et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990 – 2010 : a systematic analysis for the Global Burden of Disease Study 2010. p. 2163–2196, 2014.

Apêndice 1 – Termo de Consentimento Livre e Esclarecido

Termo de Consentimento Livre e esclarecido

Título do Projeto: Associação entre o “text neck” (pescoço de texto) e dor cervical entre alunos e funcionários de um Centro Universitário do Rio de Janeiro. **Introdução**: A dor cervical é a quarta causa de incapacidade no mundo. Com o uso crescente dos smartphones se tornou importante entender se o uso desse aparelho é ou não prejudicial à coluna cervical. **Objetivos**: Estamos realizando uma pesquisa sobre a postura ao celular. Este trabalho visa analisar a associação entre “text neck” e dor cervical entre alunos e funcionários de um Centro Universitário. **Procedimentos**: Você está sendo convidado a participar de uma pesquisa que envolve o preenchimento de um questionário. Nesta oportunidade, os participantes também serão fotografados duas vezes ao celular para análise postural. Para o preenchimento do questionário e realização da foto serão gastos, em torno, de 15 minutos. Estas atividades serão realizadas no próprio Centro Universitário, em ambiente preparado, para que não haja nenhum prejuízo de aula ou trabalho. **Potenciais riscos**: Pode ocorrer desconforto gerado pela exposição do corpo e a manutenção da postura de pé no momento do registro da fotografia. Para minimizar tal risco será garantido que o rosto não será identificado nas fotos, assim como o nome dos participantes será mantido em sigilo. **Potenciais benefícios**: Os benefícios para você incluem o conhecimento da sua qualidade postural ao celular, pois a mesma será classificada como adequada ou inadequada por fisioterapeutas qualificados. **Contato**: Os resultados das avaliações das fotos e do questionário estarão disponíveis para você. Em qualquer etapa do estudo, você terá acesso ao profissional responsável, Igor Macedo Tavares Correia (Crefito-2: 224534-F), que pode ser encontrado no telefone (21) 992359399. Se tiver alguma consideração ou dúvida sobre a ética da pesquisa, entre em contato com o Comitê de Ética em Pesquisa (CEP): Praça das Nações, no 34 - Bonsucesso, Rio de Janeiro – RJ, telefone (21) 3882-9797 (ramal 1015), e- mail: comitedeetica@unisuam.edu.br. Se desejar desistir do estudo em qualquer momento, você tem toda liberdade de fazê-lo, garantindo que a recusa de participação não acarretará qualquer penalização na sua vida acadêmica ou profissional nesta instituição. **Sigilo**: As informações a serem recebidas durante o estudo serão analisadas em conjunto com as informações obtidas de outros voluntários, não sendo divulgada a identificação de nenhum participante. **Informações complementares**: Tais informações serão utilizadas pelos pesquisadores envolvidos no projeto para fins científicos e não será permitido o acesso a terceiros, garantindo assim proteção contra qualquer tipo de discriminação. Se desejar, você poderá ser informado sobre os resultados parciais da pesquisa. Os resultados serão submetidos à publicação em revistas científicas. Não haverá despesas pessoais para você em qualquer fase do estudo, nem haverá compensação financeira relacionada à sua participação. Em caso de dano pessoal diretamente causado pelos procedimentos propostos neste estudo, você terá direito a tratamento médico, bem como às indenizações legalmente estabelecidas. **Declarações**: Acredito ter sido suficientemente informado a respeito

das informações sobre o estudo acima citado que li ou que foram lidas para mim. Ficaram claros para mim quais são os propósitos do estudo, os procedimentos a serem realizados, seus desconfortos e riscos, as garantias de confidencialidade e de esclarecimentos permanentes. Ficou claro também que minha participação é isenta de despesas e que tenho garantia de acesso a tratamento hospitalar se necessário em decorrência desse estudo. Concordo voluntariamente em participar deste estudo e poderei retirar o meu consentimento a qualquer momento, antes ou durante o mesmo, sem penalidades ou prejuízo ou perda de qualquer benefício que eu possa ter adquirido.

_____ Data: ____/____/____
Nome/Assinatura do participante

_____ Data: ____/____/____
Igor Macedo Tavares Correia (Pesquisador responsável)

Apêndice 2 – Questionário de autopreenchimento

INFORMAÇÕES GERAIS

Nome (completo):_____

Ocupação: ( ) Funcionário ( ) Estudante Idade:_____ Sexo: ( ) Masc ( ) Fem

Peso:_____ Altura:_____

Telefones:_____ Rede social:_____

BLOCO I - Escala de Autopercepção da Postura ao Celular (EAPC)

1- Qual a sua posição habitual ao digitar um texto ao celular? Por favor, marque APENAS UMA DAS 5 OPÇÕES ABAIXO.

( ) ( ) ( ) ( ) ( )Não sei responder

BLOCO II - Possíveis influências na postura

2-A Num dia de semana comum, quantas horas por dia você fica entre leitura, mensagens de texto e jogos em seu celular *smartphone*?

( ) Apenas uso o *smartphone* para falar

( ) Menos de 1 hora por dia

( ) Cerca de 1 hora por dia

( ) Cerca de 2 horas por dia

( ) Cerca de 3 horas por dia

( ) Cerca de 4 horas por dia

( ) Cerca de 5 horas por dia

( ) Cerca de 6 horas por dia

( ) Cerca de 7 ou mais horas por dia

2-B. Você tem problema de vista? **(** **)** Sim **(** **)** Não (*neste caso, passe para a questão 2-D*)

2-C. Você tem problema de vista e usa óculos (ou lente de contato)? **(** **)** Sim
(**)** Não
(**)** Uso, mas esqueci

2-D. Você se preocupa com sua postura corporal?

(**)** Muito frequentemente **(** **)** Frequentemente **(** **)** De vez em quando **(** **)** Raramente **(** **)** Nunca

2-E. Você acha que sua postura é adequada ao digitar um texto ao celular?

(**)** Muito frequentemente **(** **)** Frequentemente **(** **)** De vez em quando **(** **)** Raramente **(** **)** Nunca

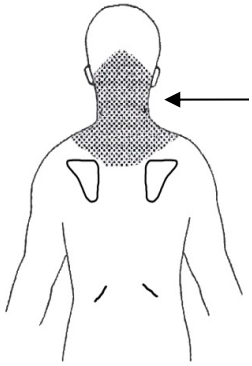
2-F. Você se preocupa com sua postura ao celular quando digita um texto?

(**)** Muito frequentemente **(** **)** Frequentemente **(** **)** De vez em quando **(** **)** Raramente **(** **)** Nunca

BLOCO III Dor no pescoço

Esta parte está relacionada com o pescoço. Use apenas um X para responder a cada pergunta. Se nenhuma das respostas for adequada, marque com um x a resposta que é mais próxima da adequada.

3. Em relação ao pescoço (região cervical) mostrado na figura, responda:



Pessoa vista por trás

3-A. Com que frequência você tem tido dor no pescoço?

(**)** Muito frequentemente **(** **)** Raramente

(**)** Frequentemente **(** **)** Nunca

3-B. Você teve dor no pescoço na **última semana**?

(**)** Sim **(** **)** Não

3-C. Você já teve dor no pescoço **hoje**?

(**)** Sim **(** **)** Não

3-D. Assinale com um “X” o máximo de dor que você já teve no pescoço.

0	1	2	3	4	5	6	7	8	9	10
Nenhuma		**Pouca**			**Razoável**			**Muita**		**Excessiva**

BLOCO IV - Impacto da dor na cervical

4. Ocupação, recreação e tratamento.

4-A. Já faltou à aula ou trabalho por causa de dor no pescoço? **( )** Muito frequentemente **( )** Frequentemente **( )** De vez em quando **( )** Raramente **( )** Nunca
4-B. A dor no pescoço já te tirou de uma prática esportiva? **( )** Muito frequentemente **( )** Frequentemente **( )** De vez em quando **( )** Raramente **( )** Nunca
4-C. Você já foi a um médico ou fisioterapeuta por causa de dor no pescoço? **( )** Muito frequentemente **( )** Frequentemente **( )** De vez em quando **( )** Raramente **( )** Nunca

Escala de Dependência do Smartphone – versão curta

1. Não consigo cumprir o trabalho planejado devido ao uso do smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

2. Tenho dificuldades de concentração durante as aulas, enquanto realizo tarefas ou trabalho devido ao uso do smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

3. Sinto dor nos punhos ou na parte de trás do pescoço enquanto uso o smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

4. Não sou capaz de ficar sem o meu smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

5. Sinto-me impaciente ou irritado quando não estou segurando meu smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

6. Tenho meu smartphone em mente mesmo quando não estou usando-o.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

7. Eu nunca vou parar de usar meu smartphone, mesmo que minha vida cotidiana seja muito afetada por isso.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

8. Constantemente checo meu smartphone para não perder conversas entre outras pessoas no Twitter ou no Facebook.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

9. Uso meu smartphone mais tempo do que tinha intenção.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

10. Pessoas ao meu redor dizem que passo muito tempo no smartphone.

( ) Discordo fortemente ( ) Discordo ( ) Discordo pouco

( ) Concordo pouco ( ) Concordo ( ) Concordo fortemente

QUESTÕES PSICOSSOCIAIS

1. **Você se sente ansioso?**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Não, de modo algum Bastante

2. **Você se sente socialmente isolado?**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Não, de modo algum Bastante

3. **“Quando sinto dor, é terrível e sinto que nunca vai melhorar”.**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Nunca faço isso Sempre faço isso

4. **“Quando sinto dor, sinto que não aguento mais”.**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Nunca faço isso Sempre faço isso

5. **Durante o mês passado, você se sentiu frequentemente incomodado por se sentir triste, deprimido ou teve uma sensação de desesperança?**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Nunca O tempo todo

6. **Durante o mês passado, você se sentiu frequentemente incomodado por ter pouco interesse ou prazer em fazer as coisas?**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Nunca O tempo todo

7. **"A atividade física pode prejudicar meu pescoço".**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Discordo completamente Concordo completamente

8. **"Eu não deveria realizar atividades físicas que poderiam fazer a minha dor piorar".**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Discordo completamente Concordo completamente

9. **Você se sente estressado?**

0--------1--------2--------3--------4--------5--------6--------7--------8--------9--------10

Não estressado Muito estressado

10. **Você teve problemas para dormir no último mês?**

Nada (0); Um pouco (1); Alguns (2); Sério (3).

USO DE CIGARRO

1. NOS ULTIMOS 30 DIAS, em quantos dias você fumou cigarro?

( ) Nunca fumei
( ) Nenhum dia nos últimos 30 dias
( ) 1 ou 2 dias nos últimos 30 dias
( ) 3 a 5 dias nos últimos 30 dias
( ) 6 a 9 dias nos últimos 30 dias
( ) 10 a 19 dias nos últimos 30 dias
( ) 20 a 29 dias nos últimos 30 dias
( ) Todos os 30 dias nos últimos 30 dias

Questionário Internacional de Atividade Física – versão curta

Nós estamos interessados em saber que tipos de atividade física as pessoas fazem como parte do seu dia a dia. Este projeto faz parte de um grande estudo que está sendo feito em diferentes países ao redor do mundo. Suas respostas nos ajudarão a entender que tão ativos nós somos em relação à pessoas de outros países. As perguntas estão relacionadas ao tempo que você gasta fazendo atividade física na **ÚLTIMA** semana. As perguntas incluem as atividades que você faz no trabalho, para ir de um lugar a outro, por lazer, por esporte, por exercício ou como parte das suas atividades em casa ou no jardim. Suas respostas são MUITO importantes. Por favor responda cada questão mesmo que considere que não seja ativo. Obrigado pela sua participação!

Para responder as questões lembre que:

- Atividades físicas **VIGOROSAS** são aquelas que precisam de um grande esforço físico e que fazem respirar MUITO mais forte que o normal.
- Atividades físicas **MODERADAS** são aquelas que precisam de algum esforço físico e que fazem respirar UM POUCO mais forte que o normal.

Para responder as perguntas pense somente nas atividades que você realiza **por pelo menos 10 minutos contínuos** de cada vez.

1a. Em quantos dias da última semana você **CAMINHOU** por pelo menos 10 minutos contínuos em casa ou no trabalho, como forma de transporte para ir de um lugar para outro, por lazer, por prazer ou como forma de exercício?

Dias _____ por **SEMANA** ( ) Nenhum

1b. Nos dias em que você caminhou por pelo menos 10 minutos contínuos quanto tempo no total você gastou caminhando **por dia**?

Horas: _____ Minutos: _____

2a. Em quantos dias da última semana, você realizou atividades **MODERADAS** por pelo menos 10 minutos contínuos, como por exemplo pedalar leve na bicicleta, nadar, dançar, fazer ginástica aeróbica leve, jogar vôlei recreativo, carregar pesos leves, fazer serviços domésticos na casa, no quintal ou no jardim como varrer, aspirar, cuidar do jardim, ou qualquer atividade que fez aumentar **moderadamente** sua respiração ou batimentos do coração **(POR FAVOR NÃO INCLUA CAMINHADA)**.

Dias _____ por **SEMANA** ( ) Nenhum

2b. Nos dias em que você fez essas atividades moderadas por pelo menos 10 minutos contínuos, quanto tempo no total você gastou fazendo essas atividades **por dia**?

Horas: _____ Minutos: _____

3a. Em quantos dias da última semana, você realizou atividades **VIGOROSAS** por pelo menos 10 minutos contínuos, como por exemplo correr, fazer ginástica aeróbica, jogar futebol, pedalar rápido na bicicleta, jogar basquete, fazer serviços domésticos pesados em casa, no quintal ou cavoucar no jardim, carregar pesos elevados ou qualquer atividade que fez aumentar **MUITO** sua respiração ou batimentos do coração.

Dias _____ por **SEMANA** ( ) Nenhum

3b. Nos dias em que você fez essas atividades vigorosas por pelo menos 10 minutos contínuos, quanto tempo no total você gastou fazendo essas atividades **por dia**?

Horas: _____ Minutos: _____

Estas últimas questões são sobre o tempo que você permanece sentado todo dia, no trabalho, na escola ou faculdade, em casa e durante seu tempo livre. Isto inclui o tempo sentado estudando, sentado enquanto descansa, fazendo lição de casa visitando um amigo, lendo, sentado ou deitado assistindo TV. Não inclua o tempo gasto sentando durante o transporte em ônibus, trem, metrô ou carro.

4a. Quanto tempo no total você gasta sentado durante um **dia de semana**?

Horas: _____ Minutos: _____

4b. Quanto tempo no total você gasta sentado durante em um **dia de final de semana**?

Horas: _____ Minutos: _____

Anexo 1 – Parecer Consubstanciado do Comitê de Ética em Pesquisa

CENTRO UNIVERSITÁRIO AUGUSTO MOTTA/ UNISUAM

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA
Título da Pesquisa: ASSOCIAÇÃO ENTRE O “TEXT NECK” E DOR CERVICAL ENTRE ALUNOS E FUNCIONARIOS DE UM CENTRO UNIVERSITARIO DO RIO DE JANEIRO **Pesquisador:** IGOR MACEDO TAVARES CORREIA

Área Temática:
Versão: 1
CAAE: 96291118.1.0000.5235
Instituição Proponente: SOCIEDADE UNIFICADA DE ENSINO AUGUSTO MOTTA
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 2.879.546

Apresentação do Projeto:

Trata-se de um estudo observacional longitudinal com aplicação de um questionário de autopreenchimento e registro da postura do participante da pesquisa ao digitar em seu aparelho celular. Serão incluídos no estudo voluntários que sejam alunos ou funcionários do Centro Universitário Augusto Motta, na faixa etária de 18 a 65 anos de ambos os sexos.

Objetivo da Pesquisa:

Analisar a associação entre “text neck” e dor cervical em alunos e funcionários do Centro Universitário Augusto Motta.

Avaliação dos Riscos e Benefícios:

São apresentados de forma coerente com o escopo da pesquisa.

Comentários e Considerações sobre a Pesquisa:

Pesquisa relevante para área da fisioterapia e também para saúde coletiva. A originalidade e atualidade do tema são pontos que devem ser destacados. Pequenas sugestões para melhoria do TCLE foram realizadas por este parecer.

Considerações sobre os Termos de apresentação obrigatória:

Todos são apresentados adequadamente e não ferem nenhum princípio ético para desenvolvimento de pesquisas com seres humanos.

Recomendações:

Sugiro ajustar o TCLE, pois este deve ser apresentado aos indivíduos como carta convite (ex. "O(a) Senhor(a) está sendo convidado(a) a participar da pesquisa intitulada...".
Ainda no TCLE, sugiro também traduzir o termo "text neck" inserido no objeto. Mesmo que seja uma expressão já difundida mundialmente, alguns indivíduos podem ainda apresentar dificuldade na compreensão desta expressão da língua inglesa. Deve-se ressaltar que o TCLE necessita apresentar linguagem de fácil compreensão por parte o público-alvo.

Conclusões ou Pendências e Lista de Inadequações:

As sugestões não impedem o início imediato do projeto. Estas buscam apenas minimizar possíveis dúvidas que posam vir a surgir por parte do público-alvo.

Considerações Finais a critério do CEP:

O projeto está aprovado.
Cabe ressaltar que o pesquisador se compromete em anexar na Plataforma Brasil um relatório ao final da realização da pesquisa. Pedimos a gentileza de utilizar o modelo de relatório final que se encontra na página eletrônica do CEP-UNISUAM (http://www.unisuam.edu.br/index.php/ introducao-comite-etica-em-pesquisa). Além disso, em caso de evento adverso, cabe ao pesquisador relatar, também através da Plataforma Brasil.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1190091.pdf	02/08/2018 22:11:36		Aceito
Folha de Rosto	folharosto.PDF	02/08/2018 20:08:46	IGOR MACEDO TAVARES CORREIA	Aceito
Cronograma	Cronograma.docx	02/08/2018 09:58:58	IGOR MACEDO TAVARES CORREIA	Aceito
Projeto Detalhado / Brochura Investigador	projetoultimo.docx	01/08/2018 14:25:10	IGOR MACEDO TAVARES CORREIA	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	tcle.docx	01/08/2018 14:22:45	IGOR MACEDO TAVARES CORREIA	Aceito
Orçamento	Orcamento.docx	01/08/2018 14:19:56	IGOR MACEDO TAVARES CORREIA	Aceito

Situação do Parecer: Aprovado

Necessita Apreciação da CONEP: Não

RIO DE JANEIRO, 06 de setembro de 2018

Assinado por: SUSANA ORTIZ COSTA (Coordenador)

Anexo 2 – Artigo do Mestrado

Correia IMT, Ferreira AS, Fernandez J, Reis FJJ, Nogueira LAC, Meziat-Filho N. Association Between Text Neck and Neck Pain in Adults. Spine (Phila Pa 1976). 2021 May 1;46(9):571-578. doi: 10.1097/BRS.0000000000003854. PMID: 33290371.

Association between text neck and neck pain in adults

Igor Macedo Tavares Correia, MSc[1]; Arthur de Sá Ferreira, Ph.D[1]; Jessica Fernandez MSc[1]; Felipe José Jandre Reis, Ph.D[23]; Leandro Alberto Calazans Nogueira, Ph.D[1,2]; Ney Meziat-Filho, Ph.D[1]

[1]Centro Universitário Augusto Motta, UNISUAM, Rio de Janeiro, Brazil

[2]Instituto Federal do Rio de Janeiro; Department of Clinical Medicine, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

[3]Department of Clinical Medicine, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

Corresponding Author:

Ney Meziat-Filho Ph.D

Centro Universitário Augusto Motta, UNISUAM, Rio de Janeiro, Brazil

Rua Dona Isabel 94, Bonsucesso, Zipcode 21041-010

Tel.: +55 (21) 3882-9797, ext 2012; neymeziat@gmail.com

This study was supported by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

Structured Abstract

Study Design. Observational cross-sectional study.

Objective. To investigate the association between text neck and neck pain in adults.

Summary of Background Data. It has been hypothesized that the inappropriate neck posture adopted when texting and reading on a smartphone, called text neck, is related to the increased prevalence of neck pain.

Methods: The sample was composed of 582 volunteers aged between 18 and 65 years. Sociodemographics, anthropometrics, lifestyle, psychosocial, neck pain and smartphone use related questions were assessed by a self-reported questionnaire. Text neck was assessed by measuring the cervical flexion angle of the participants standing and sitting while typing a text on their smartphones, using the Cervical Range of Motion (CROM) device.

Results: Multiple logistic regression analysis and linear regression analysis showed the cervical flexion angle of the standing participant using a smartphone did not associate with the prevalence of neck pain (OR=1.00; 95% CI: 0.98 to 1.02; p=0.66), neck pain frequency (OR=1.01; 95% CI: 1.00 to 1.03; p=0.056) or maximum neck pain intensity (beta coefficient = $-5.195*10^{-5}$; 95% CI: -0.02 to 0.02; p=0.99). Also, the cervical flexion angle of the sitting participant using the smartphone did not associate with neck pain (OR=0.99; CI (95%): 0.98 to 1.01; p=0.93), neck pain frequency (OR=1.01; CI (95%) 0.99 to 1.02; p=0.13), or maximum neck pain intensity (beta coefficient = 0.002; 95% CI: -0.002 to 0.02; p=0.71).

Conclusions: Text neck was not associated with prevalence of neck pain, neck pain frequency or maximum neck pain intensity in adults.

Key words: neck pain, cervical pain, mobile phone

Level of evidence: 4

Key Points

It has been hypothesized that the flexed posture of the neck and head adopted for reading and typing while using smartphones is related to the increased prevalence of neck pain and other physical symptoms.

The aim of this study was to investigate the association between text neck and neck pain in adults.

The prevalence of neck pain was 21.4% and the mean of cervical flexion angle during the use of smartphones while standing was 34.3° (SD = 12.2) and sitting 36.3° (SD = 14.1).

Text neck was not associated with prevalence of neck pain, neck pain frequency or maximum neck pain intensity in adults.

Mini Abstract

Observational cross-sectional study with 582 adult volunteers investigated the association between text neck and neck pain in adults. Cervical flexion angle of the participant using a smartphone did not associate with the prevalence of neck pain, neck pain frequency or maximum neck pain intensity.

Introduction

Neck pain (NP) is the fourth cause of disability in the world and has continued to grow considerably over the past decade.[1–3] It has been hypothesized that the flexed posture of the neck and head adopted for reading and typing while using smartphones is related to the increased prevalence of neck pain and other physical symptoms.[4,5] In his alarming 2014 study, Hansraj[6] estimated that while in a neutral position the head weighs a relative 10-12lbs, compared to 27lbs at 15 degrees, 40lbs at 30 degrees, 49lbs at 45 degrees and 60lbs at 60 degrees. Lee et al.[7] showed that smartphone users maintain head flexion of 33-45 degrees when using smartphones. In 2017, Cuéllar and Lanman[8] claimed that text neck was an epidemic of the modern era of cell phones. The term text neck has arisen, being defined as the “detrimental” posture of cervical flexion adopted while using smartphones.[8–11]

Nevertheless a cross-sectional study of Damasceno et al.[10] did not find an association of text neck with neck pain or frequency of neck pain. However, there were some limitations, such as a subjective photographic assessment of smartphone posture, a small sample (n=150) of participants, and restricted age range (18- to 21-years old).[11] Gustafsson et al.[12] reported no association between smartphone use duration and new episodes of neck pain in a longitudinal study; moreover, the authors did not evaluate the posture adopted during the smartphone use. Therefore, we sought to investigate the association of text neck by the cervical flexion angle during smartphone use with neck pain in a larger number of individuals with a broader age range.

Methods

This is a cross-sectional study enrolling 582 volunteers aged between 18 and 65 years, who had a smartphone and were willing to participate in research. Data was collected by the researchers under a tent located in a busy area on the university campus from November 2018 to November 2019. Commuters were invited to participate through advertising signs beside the tent. Exclusion criteria were spinal surgery or any diseases that prevented the individual from adopting the unsupported

orthostatic position. Individuals with significant cognitive impairment to the point of not understanding the self-completion questionnaire were excluded as well as individuals who did not own smartphones. The study protocol followed the recommendations of The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement.[13]

The study was previously approved by the Ethics Committee of the Augusto Motta University Center (approval number 3.030.275), in accordance with national resolution 466/2012. All participants signed an informed consent term after being informed about the nature of the study and the protocol to be performed.

Self-completion questionnaire

Participants answered a self-reported questionnaire with sociodemographic (name, age and sex) and anthropometric (body mass and height) questions. Daily smartphone usage duration was assessed with the following question: “On a typical weekday, how many hours per day do you spend reading, texting and playing games on your smartphone?” Nine response options were offered, the first started with “I only use the smartphone to talk” and then the responses ranged from “less than 1 hour per day” to “About 7 or more hours per day”. Regarding possible visual problems: “Do you have vision problems?”, with answer options “yes” or “no” and also “Do you have sight problems and wear glasses or contact lens?”, the response options were: “yes”, “no” or “I wear them, but I forgot them”. Regarding posture concern, we asked: “Do you worry about your body posture?”, “Do you think your posture is appropriate when typing text on a cell phone?” and “Do you worry about your posture while using your cell phone when you type a text?” the answer options followed a five-level Likert item “very often”, “often”, “occasionally”, “rarely” and “never”.

Two questions were used to assess the point prevalence and frequency of neck pain: “Have you had neck pain today?” With the following “yes” or “no” answer options and “How often do you have neck pain?”, the response options were “very often”, “often”, “occasionally”, “rarely” and “never”. For the multivariable analysis, a dichotomized variable was created: “very often”/“often”/“occasionally” versus

“rarely”/”never”. Maximum pain intensity was assessed with a 0 to10 numerical rating scale, and the instruction: “Mark (with an x) the highest pain you have ever had in your neck.” About the impact of neck pain, it was asked “Have you ever missed work due to neck pain?”, “Has neck pain taken you out of a sport?” and “Have you ever visited a doctor or physical therapist because of neck pain?” For all these questions the following five-level Likert-type items were: “very often”, “often”, “occasionally”, “rarely” and “never”.

The smartphone dependence was investigated using the short version of the Smartphone Dependency Scale (SDS), translated into Portuguese. The total score ranges from 10 (minimum) to 60 (maximum), with the higher score indicating a higher chance of dependence on smartphone use.[14]

The variables anxiety, social isolation and depression were assessed by applying the short psychosocial questionnaire, based on the validation by Kent et al.[15] There were 4 questions as follows: anxiety - “Do you feel anxious?”, social isolation - "Do you feel socially isolated?" Answer options ranged from 0 (“no, not at all”) to 10 (“fairly”). Depression was assessed by the following two questions: “During the past month, have you often been bothered by feeling down, depressed or hopeless?” and “During the past month, have you often been bothered by little interest or pleasure in doing things?” with response options ranging on a scale from 0 (“never”) to 10 (“all the time”). We included a fifth question about stress: “Do you feel stressed?” With response options ranging from 0 (“no stress”) to 10 (“very stressed”).

Lifestyle was assessed through the short-form International Physical Activity Questionnaire (IPAQ) that classifies the individual as sedentary, insufficiently active, active or very active.[16] Smoking habits were assessed by asking, “In the last 30 days, how many days did you smoke?” With eight response options ranging from “never smoked” to “every day for the last 30 days”. Based on the Subjective Health Complaints[17], sleep quality was assessed with the following question: “Did you have trouble sleeping in the last month?” with four answer options “nothing, a little, some or seriously.”

Evaluation of cervical flexion angle

The Cervical Range of Motion (CROM) inclinometer (Deluxe model, Performance Attainment Associates, Roseville, MN) was used to measure the flexion angle of the cervical region while typing on the smartphone, assuming that the greater the cervical flexion angle, the greater the text neck. As Damasceno et al.[10], we assumed that text neck is excessive neck flexion posture, regardless of whether the person has neck pain complaints or not. Besides the excellent criterion validity of CROM when compared to an optoelectronic system, the reliability of this device was previously tested and showed an intraclass correlation coefficient (ICC) of 0.92 for cervical flexion.[18–20]

The participant was instructed to stand on a cross marked on the floor. In the orthostatic position, the CROM device was placed as if putting on a pair of glasses. The velcro straps were fastened snuggly in line with the bows. The participant was asked to send a text message to someone via their smartphone, simulating everyday use (Figure 1). The same orientation was given in the seated position in a chair without armrests. The measurement of the cervical angle with the CROM inclinometer was registered with the participant in an orthostatic and seated position. The assessor was blind to the participants' answers regarding neck pain outcomes.

Figure 1. The measure of cervical flexion angle using the CROM device while the participant was texting on the smartphone. The left participant yielded a cervical flexion angle of 56° and the right one 20°.

Sample Size

The required sample size for this study was 565 participants, considering prevalence of neck pain of 22%[21] to detect a mean difference of 4.6 degrees of neck flexion between participants with and without neck pain, assuming a standard deviation of 13 degrees with an alpha of 5% and a power of 80%. The minimal detectable change value of CROM for neck flexion ranges from 6.5 to 9.6 degrees.[22,23]

Statistical analysis

All analyses were performed using RStudio version 0.99.486. Sample characteristics were described using proportions, means and standard deviations. Logistic regression models were analyzed to investigate the association between the cervical flexion angle during texting—herein an objective measure of text neck—and the point prevalence and frequency of neck pain outcomes. Linear regression models were used to investigate the association between the cervical flexion angle during texting and maximum pain intensity. Potential confounders (age, sex, height, body mass, cell phone use time, visual problems, smoking, dependence on smartphone use, physical activity level, anxiety, depression, sleep quality, and social isolation) with a $p<0.2$ in the univariate analysis were also included in the logistic regression models or linear regression models. The significance level adopted in the study was 95%.

Results

Our sample was comprised of 71.6% women (n=417), with a mean age of 27.4 (SD = 8.8) years (Table 1). Most participants (67.8%, n= 395) reported at least 4 hours per day of smartphone use. More than half of participants (53.9%, n=314) reported some visual problem, and 45.9% (n=267) wore glasses or contact lenses. Almost half of the sample (46.2%, n=269) reported worrying about posture occasionally and 36.4% (n=212) during smartphone use.

Regarding lifestyle, 9.4% (n=55) of the participants were classified as sedentary, followed by insufficiently active (22.1%, n=129), active (41%, n=239) and

very active (27.3%, n=159). Additionally, only 15.1% (n=89) of participants reported smoking habits and 11.3% (n=66) reported serious problems with sleep.

------ Table 1 at the end of the text ----------

Prevalence of neck pain was 21.4% (n=125). Regarding frequency of neck pain, 7% (n=41) complained very often, 15.6% (n=91) often, 35.9% (n=209) occasionally, 32.1% (n=187) rarely and 9.2% (n=54) never complained. The mean of maximum neck pain intensity was 4.54 (SD=2.30). Of the total sample, 85.9% (n=500) never missed school or work, 70.6% (n=413) never missed sports, and 78.3% (n=456) never visited a doctor or physiotherapist due to neck pain. The mean of cervical flexion angle during the use of smartphones while standing was 34.3° (SD = 12.2) and sitting 36.3° (SD = 14.1).

Multiple logistic regression analyses showed that the angle of cervical flexion while standing was not associated with neck pain (OR = 1.00; 95% CI 0.98 to 1.02; p = 0.66), or frequency of neck pain (OR = 1.01; 95% CI 1.00 to 1.03; p = 0.056) (table 2). The cervical flexion angle while sitting was not associated with the prevalence of neck pain (OR = 0.99; 95% CI 0.98 to 1.01; p = 0.89), or frequency of neck pain (OR = 1.01; 95% CI 0.99 to 1.02; p = 0.13) (table 3).

------ Table 2 and 3 at the end of the text ----------

Multiple linear regression analyses showed that the angle of cervical flexion while standing was not associated with the maximum neck pain intensity (beta coefficient = $-5.195*10^{-5}$; 95% CI: -0.01 to 0.01; p=0.99) (table 4). The cervical flexion angle while sitting was not associated with the maximum neck pain intensity (beta coefficient = 0.002; 95% CI: -0.01 to 0.01; p=0.71) (table 5).

------ Table 4 at the end of the text ----------

The only potential confounders that remained associated with prevalence of neck pain in the multivariate model were age (OR = 1.04; 95% CI 1.01 to 1.06; p = 0.001) and sleep quality (OR = 1.28; CI 95% 1.01 to 1.61; p = 0.035). For the neck pain frequency outcome, none of the potential confounders remained associated with neck pain frequency. For the maximum pain intensity outcome, the three variables that remained associated with maximum neck pain were sleep quality (beta coefficient =0.30; 95% CI 0.10 to 0.51; p=0.003), smartphone use time (beta coefficient =0.11; 95% CI 0.01 to 0.21; p=0.025) and age (beta coefficient =0.027; 95% CI 0.004 to 0.05; p=0.017).

------ Table 5 at the end of the text ----------

Discussion

The present study showed that the angle of cervical flexion, an objective measure of text neck while standing and sitting in adults, was not associated with the prevalence of neck pain, frequency of neck pain or maximum neck pain intensity. Our results reinforce the findings of the study by Damasceno et al.[10], in which the association between text neck and neck pain was also not found after subjective assessment of smartphone posture performed by experienced musculoskeletal physiotherapists and the self-perception of the research participants.

Our findings contradict the hypothesis raised by the aforementioned Hansraj[6] study. At the average value found in the standing position (34° versus Hansraj 60°), the simulated load would be much lower (around 40 lb or 18 kg, verses 60 lb or 27 kg). Besides that, data from mechanical load on the necks of cadavers showed a resistance of up to 540 lb or 244.94 kg, nine times higher than mentioned by Hansraj[6]. Moreover, the authors state that in living people the resistive and adaptive capacity of the cervical spine would be even higher.[24] These are aspects of structural biomechanics, but given that pain is multidimensional, it is possible that neck pain would be influenced by other biopsychosocial factors.[25]

Our sample showed a high level of smartphone dependence, but even this variable was not associated with neck pain. Alsalameh et al.[26] who used the same

dependency scale, identified that 60% of medical students were dependent on smartphones and that such dependency was correlated with musculoskeletal dysfunction. High levels of smartphone use may lead to physical inactivity associated with musculoskeletal disorders in young adults.[27,28] The high proportion of individuals who use the smartphone for more than 4 hours daily in our study, as well as the work of Damasceno et al.[10], is a concern due to the possibility of physical inactivity and an increased risk of hand and finger symptoms.[12]

In the present study we evaluated the cervical flexion adopted during texting through the CROM inclinometer, thus translating a quantitative text neck measure. Therefore, both the subjective analysis[10] and the quantitative analysis of the current study did not associate text neck with neck pain or frequency of neck pain.

There were some potential confounders associated with neck pain outcomes in the present study. Participants with neck pain were 1.9 years older than asymptomatic subjects. However, the large sample size made it possible to identify small statistically significant differences as for age, physical activity and smartphone use time. Sleep quality was associated with neck pain and maximum pain intensity. Increasing the ordinal scale by one level toward poorer sleep quality increased the chance of neck pain about 28%. Aili et al.[29] showed that sleep disturbance was a predictor of time off work in individuals with cervical or low back pain in a longitudinal study.

The strengths of the present study are, the quantitative evaluation of the text neck through the cervical flexion angle measured by the CROM while standing and sitting. In addition, the larger sample size, a range of potential biopsychosocial confounders and a sample with a higher average age when compared to the study of Damasceno et al.[10] were also strengths. The main limitation of this study was the cross-sectional design. The question of whether the participants started to adopt a better posture after having neck pain could only be responded to with longitudinal studies. Another limitation was that we assessed the point prevalence of neck pain without differentiating between acute and chronic stages.

Considering the clinical applicability of our findings, there is an evident need for a broader view in the biopsychosocial model and not to focus only on postural changes, in order to always justify a dysfunction or pain through an injury or structural

alteration.[30] This belief can harm not only health professionals, with excessive requests of imaging exams and interventions[31] but also the patients, who end up searching for several therapies of low scientific value that often lead to higher chances of developing chronic pain. The results of the present study can help mitigate the impact of negative information regarding text neck and reinforce that the cervical spine is much stronger and resilient than has been claimed in the general media.

Text neck was not associated with neck pain, frequency of neck pain or maximum neck pain intensity in adults, even when assessed objectively. These results challenge the belief that inadequate neck posture while using smartphones leads to neck pain.

References

1. Hoy D, March L, Woolf A, et al. The global burden of neck pain: Estimates from the global burden of disease 2010 study. *Annals of the Rheumatic Diseases*. Epub ahead of print 2014. DOI: 10.1136/annrheumdis-2013-204431.

2. Vos T, Flaxman AD, Naghavi M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;380:2163–96.

3. Ståhl MK, El-Metwally AAS, Rimpelä AH. Time trends in single versus concomitant neck and back pain in Finnish adolescents: results from national cross-sectional surveys from 1991 to 2011. *BMC Musculoskeletal Disorders* 2014;15:1–7.

4. Arslan, A., & Tutgun Ünal A. Examination of cell phone usage habits and purposes of education faculty students. *International Journal of Human Sciences* 2013;10:182–201.

5. Korpinen LH, Pa RJ. Self-report of physical symptoms associated with using mobile phones and other electrical devices. *Bioelectromagnetics* 2009;30:431–7.

6. Hansraj KK. Assessment of stresses in the cervical spine caused by posture and position of the head. *Surgical technology international* 2014;25:277–9.

7. Lee S, Kang H, Shin G. Head flexion angle while using a smartphone. *Ergonomics* 2015;58:220–6.

8. Cuéllar JM, Lanman TH. “Text neck”: an epidemic of the modern era of cell phones? 2017;17:901–2.

9. Meziat-Filho N, Ferreira AS, Nogueira LAC, et al. “Text-neck”: an epidemic of the modern era of cell phones? *Spine Journal* 2018;18:714–5.

10. Damasceno GMGM, Ferreira ASAS, Nogueira LACLAC, et al. Text neck and neck pain in 18–21-year-old young adults. *European Spine Journal* 2018;27:1249–54.

11. Damasceno GMGM, Ferreira ASASA de S, Nogueira LACLAC, et al. Reliability of two pragmatic tools for assessing text neck. *Journal of Bodywork and Movement Therapies* 2018;22:963–7.

12. Gustafsson E, Thomée S, Grimby-Ekman A, et al. Texting on mobile phones and musculoskeletal disorders in young adults: A five-year cohort study. *Applied Ergonomics* 2017;58:208–14.

13. Elm E von, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol* 2008;61:344–9.

14. Mescollotto FF, Castro EM de, Pelai EB, et al. Translation of the short version of the Smartphone Addiction Scale into Brazilian Portuguese: cross-cultural adaptation and testing of measurement properties. *Brazilian Journal of Physical Therapy* 2019;23:250–6.

15. Kent P, Mirkhil S, Keating J, et al. The concurrent validity of brief screening questions for anxiety, depression, social isolation, catastrophization, and fear of movement in people with low back pain. *The Clinical journal of pain* 2014;30:479–89.

16. Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise* 2003;35:1381–95.

17. Eriksen HR, Ihlebaek C, Ursin H. A scoring system for subjective health complaints (SHC). *Scandinavian journal of public health* 1999;27:63–72.

18. Bush KW, Collins N, Portman L, et al. Validity and Intertester Reliability of Cervical Range of Motion Using Inclinometer Measurements. 2000;8:52–61.

19. Capuano-Pucci D, Rheault W, Aukai J, et al. Intratester and intertester reliability of the cervical range of motion device. *Archives of physical medicine and rehabilitation* 1991;72:338–40.

20. Michel Tousignant, Cécile Smeesters, Anne-Marie Breton, Émilie Breton HC. Criterion validity study of the cervical range of motion (CROM) device for rotational range of motion on healthy adults. *The Journal of orthopaedic and sports physical therapy* 2006;36:242–8.

21. Genebra CVDS, Maciel NM, Bento TPF, et al. Prevalence and factors associated with neck pain: a population-based study. *Brazilian Journal of Physical Therapy* 2017;21:274–80.

22. Audette I, Dumas JP, Côté JN, et al. *Validity and between-day reliability of the cervical range of motion (CROM) device*. Movement Science Media. Epub ahead of print 2010. DOI: 10.2519/jospt.2010.3180.

23. Fletcher JP, Bandy WD. Intrarater reliability of CROM measurement of cervical spine active range of motion in persons with and without neck pain. *Journal of Orthopaedic and Sports Physical Therapy* 2008;30:640–5.

24. Przybyla AS, Skrzypiec D, Pollintine P, et al. Strength of the Cervical Spine in Compression and Bending. *Spine* 2007;32:1612–20.

25. Karen V. Richards, Darren J. Beales, Anne J. Smith, Peter B. O'Sullivan LMS. Neck Posture Clusters and Their Association With Biopsychosocial Factors and Neck Pain in Australian Adolescents. *Physical therapy* 2016;96:1576–87.

26. Alsalameh AM, Harisi MJ, Alduayji MA, et al. Evaluating the relationship between smartphone addiction/overuse and musculoskeletal pain among medical students at Qassim University. *Journal of family medicine and primary care* 2019;8:2953–9.

27. Guddal MH, Stensland SØ, Johnsen MB. Physical Activity Level and Sport Participation in Relation to Musculoskeletal Pain in a Population-Based Study of Adolescents The Young-HUNT Study. *Orthopaedic Journal of Sports Medicine* 2017;5:1–9.

28. Scarabottolo CC, Pinto RZ, Oliveira CB, et al. Back and neck pain prevalence and their association with physical inactivity domains in adolescents. *European Spine Journal* 2017;26:2274–80.

29. Aili K, Nyman T, Hillert L, et al. Sleep disturbances predict future sickness absence among individuals with lower back or neck-shoulder pain: A 5-year prospective study. *Scandinavian journal of public health* 2015;43:315–23.

30. Sullivan PO, Caneiro JP, Keeffe MO, et al. Unraveling the Complexity of Low Back Pain. *Journal of Orthopaedic & Sports Physical Therapy* 2016;46:932–7.

31. Traeger AC, Moynihan RN, Maher CG. Wise choices: making physiotherapy care more valuable. *Journal of Physiotherapy* 2017;63:2–4.

Table 1. Characteristics of the participants (n=582).

Age (years), mean (SD)	27.44 (8.89)	Neck flexion angle (CROM) standing (degrees), mean (SD)	34.34(12.22)
Sex, n female (%)	417(71.64)	Neck flexion angle (CROM) sitted (degrees), mean (SD)	36.30(14.11)
Body mass (kg), mean (SD)	69.69 (16.1)	Neck pain (point prevalence), n (%)	125(21.47)
Height (cm), mean (SD)	166.09(9.58)	Neck pain frequency, n (%)	
Physical activity level, n (%)		Very often	41(7.04)
Sedentary	55(9.45)	Often	91(15.63)
Insufficiently active	129(22.16)	Occasionally	209(35.91)
Active	239(41.06)	Rarely	187(32.13)
Very active	159(27.31)	Never	54(9.27)
Smoking, smokers (%)	89(15.15)	Maximum neck pain intensity, mean (SD)	4.54(2.30)
Smartphone use time, n (%)		Missed school due to neck pain, n (%)	
I only use the smartphone to talk	8(1.37)	Very often	41(6.01)
Less than one hour a day	16(2.74)	Often	3(0.51)
About 1 hour a day	23(3.95)	Occasionally	14(2.4)
About 2 hours a day	62(10.65)	Rarely	30(5.15)
About 3 hours a day	78(13.40)	Never	500(85.91)
About 4 hours a day	84(14.43)	Missed sports due to neck pain, n (%)	
About 5 hours a day	68(11.68)	Very often	31(5.32)
About 6 hours a day	72(12.37)	Often	12(2.06)
About 7 hours a day or more	171(29.38)	Occasionally	43(7.38)
Visual impairments, n (%)	314(53.95)	Rarely	83(14.26)
Glasses or lens use, n (%)	267(45.95)	Never	413(70.66)
Worry about posture, n (%)		Went to a doctor or physiotherapist, n (%)	
Very often	61(10.48)	Very often	36(6.18)
Often	164(28.17)	Often	14(2.4)
Occasionally	269(46.21)	Occasionally	31(5.32)
Rarely	68(11.68)	Rarely	45(7.73)
Never	20(3.43)	Never	456(78.35)

		Smartphone dependence (SAS), mean (SD)	31,68(9.94)
		Anxiety (0-10), mean (SD)	6.6(2.73)
Smartphone adequate posture, n (%)			
Very often	10(1.71)		
Often	49(8.41))	Social isolation (0-10), mean (SD)	2.46(2.73)
Occasionally	203(34.87)	Depression (0-10), mean (SD)	4(3.24)
Rarely	197(33.84)	Stress (0-10), mean (SD)	5.79(2.04)
Never	123(21.13)	Sleep problems, n (%)	
Worry about smartphone posture, n (%)		Nothing	166(28.57)
Very often	10(3.61)	A little	198(34.07)
Often	49(12.56)	Some	151(25.98)
Occasionally	212(36.48)	Seriously	66(11.35)
Rarely	175(30.12)		
Never	100(17.21)		

Table 2. Odds ratio (OR) for the association between text neck while standing - assessed by cervical flexion angle - with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)		
	OR ajdusted	95% CI	*p*-value
Cervical flexion angle (CROM*), standing	1.00	0.98–1.02	0.669
Age	1.04	1.01–1.06	0.001
Sex (male)	0.70	0.39–1.24	0.229
Body mass	1.00	0.98–1.01	0.707
Smartphone use time	1.11	0.98–1.25	0.089
Smartphone dependence	1.00	0.98–1.03	0.515
Anxiety	1.01	0.92–1.11	0.721
Social isolation	1.06	0.98–1.16	0.121
Depression	1.01	0.93–1.10	0.723
Sleep quality	1.28	1.01–1.61	0.035
	Frequency of neck pain (model 2)		
	OR ajdusted	95% CI	*p*-value
Cervical flexion angle (CROM*), standing	1.01	1.00–1.03	0.056
Height	0.99	0.96–1.01	0.408
Sex (male)	0.64	0.38–1.07	0.089
Sleep quality	1.12	0.92–1.36	0.250
Smartphone use time	1.02	0.93–1.11	0.660
Smartphone dependence	1.02	0.99–1.04	0.077
Anxiety	1.05	0.97–1.13	0.164
Social isolation	1.05	0.97–1.13	0.197
Depression	0.99	0.92–1.07	0.961

*Cervical range of motion instrument

Table 3. Odds ratio (OR) for the association between text neck while sitting - assessed by cervical flexion angle – with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)		
	Adjusted OR	95% CI	*p*-value
Cervical flexion angle (CROM*), sitting	0.99	0.98–1.01	0.892
Age	1.04	1.01–1.06	0.001
Sex (male)	0.72	0.41–1.27	0.271
Body mass	1.00	0.98–1.01	0.709
Smartphone use time	1.11	0.98–1.25	0.088
Smartphone dependence	1.01	0.98–1.03	0.457
Anxiety	1.01	0.92–1.11	0.717
Social isolation	1.06	0.98–1.16	0.128
Depression	1.01	0.93–1.10	0.705
Sleep quality	1.28	1.01–1.61	0.035
	Frequency of neck pain (model2)		
	OR adjusted	95% CI	*p*-value
Cervical flexion angle (CROM*), sitting	1.01	0.99–1.02	0.130
Height	0.99	0.96–1.01	0.518
Sex (masculine)	0.65	0.39–1.09	0.105
Sleep quality	1.12	0.91–1.36	0.261
Smartphone use time	1.02	0.93–1.12	0.637
Smartphone dependence	1.02	0.99–1.04	0.073
Anxiety	1.05	0.98–1.13	0.156
Social isolation	1.05	0.97–1.13	0.192
Depression	0.99	0.92–1.07	0.961

*Cervical range of motion instrument

Table 4. Beta coefficients for the association between text neck while standing - assessed by cervical flexion angle - and maximum neck pain intensity, considering potential confounders.

	Maximum pain intensity (0–10)		
	Adjusted beta coefficient	95% CI	*p*-value
Cervical flexion angle (CROM*), standing	$-5.195*10^{-5}$	-0.01–0.01	0.995
Age	0.028	$5.40*10^{-2}$–0.05	0.015
Height	$4.383*10^{-4}$	-0.02–0.02	0.972
Sex (male)	-0.249	-0.78–0.33	0.427
Sleep quality	0.308	0.99–0.51	0.003
Smartphone use time	0.116	0.01–0.21	0.025
Smartphone dependence	0.021	$-8.24*10^{-4}$–0.04	0.058
Anxiety	0.034	-0.04–0.11	0.398
Social isolation	0.034	-0.04–0.11	0.377
Depression	0.038	-0.03–0.11	0.331
Physical activity (sedentary)	0.353	-0.04–0.74	0.078
Vision problems	0.297	-0.08–0.68	0.127

*Cervical range of motion instrument

Scientific notation was used when the number of zeros exceeded two after the decimal point.

Table 5. Beta coefficients for the association between text neck while sitting - assessed by cervical flexion angle - and maximum neck pain intensity, considering potential confounders.

	Maximum pain intensity (0–10)		
	Adjusted beta coefficient	95% CI	*p*-value
Cervical flexion angle (CROM*), sitting	-0.002	-0.01–0.01	0.713
Age	0.027	0.004–0.05	0.017
Height	$3.53*10^{-4}$	-0.02–0.02	0.978
Sex (male)	-0.213	-0.76–0.34	0.450
Sleep quality	0.309	0.10–0.51	0.003
Smartphone use time	0.116	0.01–0.21	0.025
Smartphone dependence	0.022	$-1.35*10^{-4}$–0.04	0.051
Anxiety	0.034	-0.04–0.11	0.399
Social isolation	0.033	-0.04–0.11	0.392
Depression	0.038	-0.03–0.11	0.324
Physical activity (sedentary)	0.356	-0.03–0.75	0.075
Vision problems	0.300	-0.08–0.68	0.123

*Cervical range of motion instrument

Scientific notation was used when the number of zeros exceeded two after the decimal point.

PARTE II – PRODUÇÃO INTELECTUAL

Contextualização da Produção

Quadro 4: Declaração de desvios de projeto original.

Declaração dos Autores	Sim	Não
A produção intelectual contém desvios substantivos do tema proposto no projeto de pesquisa?		x
Justificativas e Modificações		
A produção intelectual contém desvios substantivos do delineamento do projeto de pesquisa?		x
Justificativas e Modificações		
A produção intelectual contém desvios substantivos dos procedimentos de coleta e análise de dados do projeto de pesquisa?		x
Justificativas e Modificações		

Disseminação da Produção

Artigo completo publicado em periódico:

Correia IMT, Grasser T, Meziat-Filho N. Letter to the Editor concerning "Neck pain associated with smartphone overuse: cross-sectional report of a cohort study among office workers" by Derakhshanrad N, et al. (Eur Spine J. 2020 doi: 10.1007/s00586-020-06640-z). Eur Spine J. 2022 Oct;31(10):2824-2825. doi: 10.1007/s00586-022-07323-7. Epub 2022 Jul 22. PMID: 35869328.

European Spine Journal
https://doi.org/10.1007/s00586-022-07323-7

LETTER TO THE EDITOR

Letter to the Editor concerning "Neck pain associated with smartphone overuse: cross-sectional report of a cohort study among office workers" by Derakhshanrad N, et al. (Eur Spine J. 2020 doi: 10.1007/s00586-020-06640-z)

Igor Macedo Tavares Correia[1] · Tatiana Grasser[1,2] · Ney Meziat-Filho[1]

Received: 30 January 2021 / Revised: 30 January 2021 / Accepted: 6 July 2022

We would like to thank the authors for the article "Neck pain associated with smartphone overuse: cross-sectional report of a cohort study among office workers" [1]. However, there is a range of conceptual and methodological shortcomings that deserve further discussion.

First, smartphone overuse was measured by the Smartphone Addiction Scale short version (SAS-SV), ranging from 10 to 60 with the highest score representing the maximal use of smartphone in the past year. According to the study related to the development of smartphone addiction scale [2], smartphones also caused symptoms of addiction similar to the effects of the internet including craving, withdrawal, tolerance, daily-life disturbance, and preference of cyberspace-oriented relationships, which were confirmed through the diagnosis. Therefore, SAS was not developed to assess smartphone overuse, but the addiction to smartphones, which is a different concept. There are people that spend a lot of time using their smartphones because they work using the device. Although these people overuse their smartphones, they are not necessarily addicted. Smartphone overuse should have been assessed by objective (e.g. apps) or self-reported measures (e.g. questions) of time spent using the device. Since the authors used SAS, they investigated the association between smartphone addiction and neck pain, not smartphone overuse and neck pain.

Second, if we considered that the authors found an association between smartphone addiction and neck pain, it would be reasonable to think that the association may be confounded by psychological variables (e.g. anxiety), instead of biomechanical variables (e.g. posture). The authors collected data of anxiety, depression and stress, but although anxiety was associated with neck pain in the univariate analysis (table 20), it was not included in the multivariate logistic regression model (table 3). Therefore, we don't know whether anxiety would neutralize or attenuate the association between smartphone addiction and neck pain.

Third, the authors affirm that individuals who adopt neck flexion posture using smartphones would be more susceptible to nociceptive mechanisms and that may be the causative mechanism to explain their study results. However, the authors did not assess posture during smartphone use. Damasceno et al. [3] did not find an association between text neck, defined as the "detrimental" posture of cervical flexion adopted while using smartphones and assessed by photographic analysis, and neck pain or frequency of neck pain in a cross-sectional study with 150 young adults. A recent cross-sectional study by Correia et al. [4] found no association between text neck, assessed by CROM while standing and sitting, and neck pain, frequency of neck pain or maximal intensity of neck pain, in a cross-sectional study with 582 adults. Time spent using a smartphone was not associated with neck pain in the two above-mentioned studies. Smartphone addiction was not associated with neck pain in the last one.

In conclusion, there is no convincing evidence to support any recommendation regarding time spent or neck posture while using a smartphone to avoid neck pain.

✉ Igor Macedo Tavares Correia
igorcorreiafisio@gmail.com

[1] Postgraduate Program in Rehabilitation Sciences, Centro Universitário Augusto Motta, UNISUAM, Rua Dona Isabel 94, Térreo, Bonsucesso, Rio de Janeiro, RJ, Brazil

[2] Instituto Federal Do Paraná, IFPR, Curitiba, Brazil

Published online: 22 July 2022

References

1. Derakhshanrad N, Yekaninejad MS, Mehrdad R, Saberi H (2020) Neck pain associated with smartphone overuse: cross-sectional

Produção colaborativa:

Meziat-Filho N, Grasser T, **Correia I**, Reis FJJ. Comment on: Text neck misdiagnosed as fibromyalgia. Rheumatology (Oxford). 2023 Jun 1;62(6):e199-e200. doi: 10.1093/rheumatology/keac642. PMID: 36355563.

Rheumatology, 2022, **00**, 1–2
https://doi.org/10.1093/rheumatology/keac642
Advance access publication 10 November 2022
Letter to the Editor

Letter to the Editor (Matters arising from published papers)

Comment on: Text neck misdiagnosed as fibromyalgia

Ney Meziat-Filho [1]*, Tatiana Grasser[1,2], Igor Correia[1], Felipe J. J. Reis [3,4,5]

[1]Postgraduate Program in Rehabilitation Sciences, Centro Universitário Augusto Motta (UNISUAM), Rio de Janeiro, RJ, Brazil
[2]Instituto Federal do Paraná, IFPR, Paraná, Curitiba, Brazil
[3]Department of Clinical Medicine, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil
[4]Pain in Motion Research Group, Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education & Physiotherapy, Vrije Universiteit Brussel, Brussels, Belgium
[5]Instituto Federal do Rio de Janeiro, IFRJ, Rio de Janeiro, RJ, Brazil

*Correspondence to: Ney Meziat-Filho, Postgraduate Program in Rehabilitation Sciences, Centro Universitário Augusto Motta, UNISUAM, Rua Dona Isabel 94, Bonsucesso, Rio de Janeiro, RJ 21041-010, Brazil. Email: neymeziat@gmail.com

Dear Editor, We would like to thank the authors of the article 'Text neck misdiagnosed as fibromyalgia' [1] for highlighting a new behaviour that is hypothesized to be a cause of neck pain. However, some claims and recommendations of the authors need further discussion.

First, text neck syndrome is not a valid diagnosis since there is no evidence that the habit of using smartphones in a neck flexed posture is associated with neck pain. Damasceno *et al.* [2], in a cross-sectional study with 150 young adults, assessed neck posture by participants' self-perception and physiotherapists' judgement during a mobile phone texting message task. There was no association between neck posture and neck pain. Correia *et al.* [3], in a cross-sectional study enrolling 582 volunteers aged between 18 and 65 years, investigated the association between text neck and neck pain. A cervical range of motion (CROM) inclinometer was used to measure the flexion angle of the cervical region while typing on a smartphone, assuming that the greater the cervical flexion angle, the greater the text neck. Multiple logistic regression analysis and linear regression analysis showed the cervical flexion angle of the standing participant using a smartphone did not associate with the prevalence of neck pain (odds ratio [OR] = 1.00; 95% CI: 0.98, 1.02; $P = 0.66$), neck pain frequency (OR = 1.01; 95% CI: 1.00, 1.03; $P = 0.056$) or maximum neck pain intensity (β-coefficient = -5.195×10^{-5}; 95% CI: −0.02, 0.02; $P = 0.99$). Also, the cervical flexion angle of the sitting participant using a smartphone did not associate with neck pain (OR = 0.99; 95% CI: 0.98, 1.01; $P = 0.93$), neck pain frequency (OR = 1.01; 95% CI 0.99, 1.02; $P = 0.13$) or maximum neck pain intensity (β-coefficient = 0.002; 95% CI: −0.002, 0.02; $P = 0.71$). Bertozzi *et al.* [4] assessed the angle of neck flexion (CROM), pain intensity (VAS) and disability (Neck Disability Index) of 238 medical students. No significant correlations were observed between the number of hours spent and posture (CROM) while using a smartphone and neck pain and disability. While half of young medical students reported neck pain, the use of smartphones was not correlated with neck pain and disability. A longitudinal study with 686 participants showed that neck posture at 17 years was not a risk factor for persistent neck pain at 22 years of age in males, whereas in females, more relaxed postures (slumped thorax/forward head and intermediate postures) were protective of neck pain compared with upright posture [5].

Second, the authors claim that text neck is characterized by cervical spine damage caused by repeated stress from neck flexion while looking down at a mobile screen or computer. In his alarming 2014 study, Hansraj [6] estimated that while in a neutral position the head weighs a relative 4.5–5.4 kg (10–12 lbs), compared with 12.2 kg (27 lbs) at 15 degrees, 18.1 kg (40 lbs) at 30 degrees, 22.2 kg (49 lbs) at 45 degrees and 27 kg (60 lbs) at 60 degrees. Data from mechanical load on the necks of cadavers showed a resistance of up to 244.94 kg (540 lbs), nine times higher than mentioned by Hansraj [7]. Moreover, the authors state that in living people the resistive and adaptive capacity of the cervical spine would be even higher. Magnetic resonance imaging of the case reported in the study of Horino *et al.* [1] showed normal findings including the straightening of the cervical spine [8]. These are aspects of structural biomechanics, but given that pain is multidimensional, it is possible that the patient's neck pain would have been influenced by other biopsychosocial factors.

Third, we argue that the authors should have recognized the limitations of a case report design in term of bias and random errors. Even if text neck were a cause of neck pain, it is not possible to prove that raising a smartphone to eye level while texting was an effective treatment for neck symptoms without a representative number of participants, a control group and randomization.

There is a prevailing reasoning that the main cause of spinal pain is structural vulnerability, such that posture correction plays a major role in avoiding tissue damage. The belief of pain as a synonym of tissue damage may contribute to a lack

Accepted: 19 October 2022

Grasser T, Borges Dario A, Parreira PCS, **Correia IMT**, Meziat-Filho N. Defining text neck: a scoping review. Eur Spine J. 2023 Oct;32(10):3463-3484. doi: 10.1007/s00586-023-07821-2. Epub 2023 Jul 5. PMID: 37405530.

European Spine Journal
https://doi.org/10.1007/s00586-023-07821-2

REVIEW ARTICLE

Defining text neck: a scoping review

Tatiana Grasser[1,2,3] · Amabile Borges Dario[4] · Patricia Carmo Silva Parreira[5] · Igor Macedo Tavares Correia[1] · Ney Meziat-Filho[1]

Received: 2 February 2023 / Revised: 2 February 2023 / Accepted: 7 June 2023

Abstract

Background Text neck is regarded as a global epidemic. Yet, there is a lack of consensus concerning the definitions of text neck which challenges researchers and clinicians alike.

Purpose To investigate how text neck is defined in peer-reviewed articles.

Methods We conducted a scoping review to identify all articles using the terms "text neck" or "tech neck." Embase, Medline, CINAHL, PubMed and Web of Science were searched from inception to 30 April 2022. We followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMAScR) guidelines. No limitation was applied for language or study design. Data extraction included study characteristics and the primary outcome relating to text neck definitions.

Results Forty-one articles were included. Text neck definitions varied across studies. The most frequent components of definitions were grouped into five basis for definition: Posture ($n=38$; 92.7%), with qualifying adjectives meaning incorrect posture ($n=23$; 56.1%) and posture without a qualifying adjective ($n=15$; 36.6%); Overuse ($n=26$; 63.4%); Mechanical stress or tensions ($n=17$; 41.4%); Musculoskeletal symptoms ($n=15$; 36.6%) and; Tissue damage ($n=7$; 17.1%).

Conclusion This study showed that posture is the defining characteristic of text neck in the academic literature. For research purposes, it seems that text neck is a habit of texting on the smartphone in a flexed neck position. Since there is no scientific evidence linking text neck with neck pain regardless of the definition used, adjectives like inappropriate or incorrect should be avoided when intended to qualify posture.

Keywords Neck pain · Smartphone · Posture · Cervical spine

Introduction

Text neck is proposed to be one of the causes of neck pain [1, 2]. The term text neck emerged in 2008, after a chiropractor reported observing a teenager with neck complaints and bad posture while texting on her cell phone [3]. The idea was supported by some biological plausibility and biomechanical findings. Studies had shown that individuals have a more forward head posture when viewing a smartphone screen, compared to neutral standing [4, 5]. Having a forward head posture has been associated with an increased mechanical load on joints and ligaments of the cervical spine, which could boost the demand on the posterior neck muscles by the increased gravitational moment [2]. Some argued that these biomechanical changes can lead to repetitive stress injury and neck pain [2, 6].

The term text neck quickly spread through the media worldwide [7-10]. Currently, text neck is a popular label among healthcare professionals and patients, despite the lack of supporting evidence. Several blogs and non-academic articles are available on the internet with recommendations on how text neck is defined. Yet, most online information does not provide any reference and are unlikely to be based on academic literature. This is problematic as health

✉ Tatiana Grasser
tgrasser@gmail.com

1 Centro Universitário Augusto Motta, UNISUAM, Rua Dona Isabel 94, Bonsucesso, Rio de Janeiro, RJ CEP 21041-010, Brazil

2 Instituto Federal de Educação, Ciência e Tecnologia do Tocantins, Palmas, Brazil

3 Instituto Federal de Educação, Ciência e Tecnologia do Paraná, Curitiba, Brazil

4 Faculty of Medicine and Health, Sydney School of Health Sciences, University of Sydney, Sydney, Australia

5 HEOR Consultant, MAPESolution, São Paulo, Brazil

Published online: 05 July 2023

Correia I, Meziat-Filho N, Furlan AD, Saragiotto B, Reis FJJ. Are we missing the opioid consumption in low- and middle-income countries? Scand J Pain. 2023 Nov 13;24(1). doi: 10.1515/sjpain-2023-0086. PMID: 38126164.

DE GRUYTER Scand J Pain 2024; 24(1): 20230086

Short Communication

Igor Correia, Ney Meziat-Filho, Andrea D. Furlan, Bruno Saragiotto and Felipe J. J. Reis*

Are we missing the opioid consumption in low- and middle-income countries?

https://doi.org/10.1515/sjpain-2023-0086
Received June 28, 2023; accepted October 26, 2023;
published online November 13, 2023

Abstract

Objectives: The rise in opioid prescriptions with a parallel increase in opioid use disorders remains a significant challenge in some developed countries (opioid epidemic). However, little is known about opioid consumption in low- and middle-income countries (LMICs). In this short report, we aim to discuss the increase in opioid consumption in LMICs by providing an update on the opioid perspective in Brazil.
Methods: We analyzed opioid sales on the publicly available Brazilian Health Regulatory Agency (ANVISA) database from 2015 to 2020.
Results: In Brazil, opioid sales increased 34.8 %, from 8,839,029 prescriptions in 2015 to 11,913,823 prescriptions in 2020, this represents an increase from 44 to 56 prescriptions for every 1,000 inhabitants. Codeine phosphate combined with paracetamol and tramadol hydrochloride were the most common opioids prescribed with an increase each year.
Conclusions: The results suggest that opioid prescriptions are rising in Brazil in a 5 years period. Brazil may have a unique opportunity to learn from other countries and develop consistent policies and guidelines to better educate patients and prescribers and to prevent an opioid crisis.

Keywords: opioids; opioid consumption; opioid crisis; pain

***Corresponding author: Felipe J. J. Reis**, Physical Therapy Department of Instituto Federal do Rio de Janeiro (IFRJ), Rio de Janeiro, Brazil; Postgraduation Progam in Clinical Medicine – Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil; and Pain in Motion Research Group, Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education & Physiotherapy, Vrije Universiteit Brussel, Brussels, Belgium, E-mail: felipe.reis@ifrj.edu.br. https://orcid.org/0000-0002-9471-1174
Igor Correia and Ney Meziat-Filho, Postgraduate Program in Rehabilitation Sciences – Centro Universitário Augusto Motta (UNISUAM), Rio de Janeiro, Brazil
Andrea D. Furlan, KITE, Toronto Rehabilitation Institute, University Health Network, Toronto, Ontario, Canada; Division of Physical Medicine & Rehabilitation, Department of Medicine, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada; and Institute for Work & Health, Toronto, Ontario, Canada
Bruno Saragiotto, Masters and Doctoral Programs in Physical Therapy – Universidade Cidade de São Paulo (UNICID), São Paulo, Brazil; and Discipline of Physiotherapy, Graduate School of Health, University of Technology Sydney, Sydney, Australia

Introduction

The opioid crisis is a serious public health problem in developed countries such as the United States (U.S.) and Canada [1, 2]. In the US, opioid crisis resulted in nearly 500,000 deaths in the last 2 decades. Although the opioid crisis is recognized by cases of fatal overdoses, opioid use disorder also has social and economic impacts [3]. It has been estimated that economic costs in the U.S. associated with health care expenses, criminal justice, lost productivity and reduced quality of life topped $1 trillion with 54 % attributed to overdose deaths and 46 % to opioid use disorder in 2017 [4]. However, the opioid crisis is not exclusive to North America. The World Health Organization (WHO) has recognized opioid use disorder as an international problem and responsible for more than 8,000 opioid overdose deaths in Europe in 2017 [5]. In Australia, opioid deaths accounted for 62 % of all drug-related deaths in recent years and the total number of opioid-related deaths are increasing every year [6].

The variable rates of opioid consumption between high-income countries and low- and middle-income countries (LMICs) [7] as well as strong regulatory policies suggest that the opioid crisis is not yet a problem in LMICs [8]. However, there are compelling data showing an increase in opioid consumption in LMICs [9, 10]. A recent study reported an increase in the total consumption of strong opioids in Malaysia (increase of 993.18 %), Indonesia (increase of 530.34 %), Vietnam (increase of 170.17 %), Singapore (increase of 116.16 %) and Thailand (increase of 104.66 %) in a period of 10 years [9].

From 2009 to 2015, opioid consumption in Brazil increased from 8 to 44 sales per 1,000 inhabitants – accounting for an increase of 465 % [10]. The main consumed substance in this period was codeine representing 98 % of all sales. Our aim with this short communication is to discuss the increase in opioid consumption in LMICs by providing an update on the opioid perspective in Brazil from 2015 to 2020.

Santos RP, Alonso TP, **Correia IMT**, Nogueira LC, Meziat-Filho N, Reis FJJ. Patients should not rely on low back pain information from Brazilian official websites: A mixed-methods review. Braz J Phys Ther. 2022 Jan-Feb;26(1):100389. doi: 10.1016/j.bjpt.2022.100389. Epub 2022 Jan 21. PMID: 35091137; PMCID: PMC8803602.

ARTICLE IN PRESS
JID: BJPT [mSP6P;January 20, 2022;13:44]
Brazilian Journal of Physical Therapy xxx (xxxx) 100389
Brazilian Journal of Physical Therapy
https://www.journals.elsevier.com/brazilian-journal-of-physical-therapy

Patients should not rely on low back pain information from Brazilian official websites: A mixed-methods review.

Raiany Pires Santos[a], Thamires Prazeres Alonso[a], Igor Macedo Tavares Correia[b], Leandro Calazans Nogueira[b,c], Ney Meziat-Filho[b], Felipe J.J. Reis[c,d,e,*]

[a] *Instituto Brasileiro de Medicina de Reabilitação in Rio de Janeiro (IBMR), Rio de Janeiro, RJ, Brazil*
[b] *Postgraduation Program in Rehabilitation Sciences, Centro Universitário Augusto Motta (UNISUAM), Rio de Janeiro, RJ, Brazil*
[c] *Physical Therapy Department, Instituto Federal do Rio de Janeiro (IFRJ), Rio de Janeiro, RJ, Brazil*
[d] *Postgraduation Program in Clinical Medicine, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil*
[e] *Pain in Motion Research Group, Department of Physical Therapy, Human Physiology and Anatomy, Faculty of Physical Education & Physical Therapy, Vrije Universiteit Brussel, Brussels, Belgium*

Received 28 January 2021; received in revised form 2 October 2021; accepted 17 December 2021
Available online xxx

KEYWORDS
Access to information;
Consumer health information;
Information dissemination;
Low back pain;
Medical informatics;
Physical therapy

Abstract
Background: Websites from official organizations (e.g., Ministry of Health and Professional Councils) are assumed to be trustworthy sources of information.
Objective: To investigate the credibility, accuracy, and readability of low back pain (LBP) web-based content in Brazilian official websites.
Methods: Mixed-methods review. Google search was used for retrieving web-information about Brazilian trustworthy organizations. We assessed the URLs on three domains: credibility, accuracy, and readability of LBP contents. Qualitative analysis was performed using an open source platform in three stages: (1) organization into thematic units; (2) data exploration; and (3) interpretation of the data and summarization.
Results: We included 84 URLs. Accuracy was assessed for 58 URLs and none fully adhered to the guidelines. Credibility analysis was performed for 67 URLs. Disclosure of authorship was not mentioned in 58 (87%) of the URLs, 63 (94%) did not mention the sources of their information, none presented a declaration of conflict of interest, and 16 (24%) did not provide the date of creation. Readability was assessed for 72 URLs and was classified as "easy" to read in 65%. Six main themes emerged in the qualitative analysis: (1) Explanations and causes for LBP, (2) diagnosis, (3) recommendations about medication, (4) recommendations for coping and self-management, (5) performing exercises, and (6) recommendations for children and adolescents.

* Corresponding author at: Instituto Federal do Rio de Janeiro, Campus Realengo - Rua Carlos Wenceslau, 343, Realengo.CEP 21715-000, Rio de Janeiro, RJ, Brazil.
E-mail: felipe.reis@ifrj.edu.br (F.J. Reis).

https://doi.org/10.1016/j.bjpt.2022.100389

Please cite this article in press as: R.P. Santos, T.P. Alonso, I.M. Correia et al., Patients should not rely on low back pain information from Brazilian official websites: A mixed-methods review., *Brazilian Journal of Physical Therapy* (2022), https://doi.org/10.1016/j.bjpt.2022.100389

Thamires Prazeres Alonso, Raiany Pires dos Santos, **Igor Macedo Tavares Correia**, Leandro Alberto Calazans Nogueira, Ney Meziat-Filho, Felipe José Jandre Reis. Credibility, accuracy and readability of patient-oriented information about low back pain on Brazilian websites: a mixed-method review. BrJP. São Paulo, 2023 jan-mar;6(1):63-7. DOI 10.5935/2595-0118.20220069-en

BrJP. São Paulo, 2023 jan-mar;6(1):63-7 **ORIGINAL ARTICLE**

Credibility, accuracy and readability of patient-oriented information about low back pain on Brazilian websites: a mixed-method review

Credibilidade, acurácia e legibilidade das informações orientadas ao paciente sobre dor lombar em sites brasileiros: uma revisão de método misto

Thamires Prazeres Alonso[1], Raiany Pires dos Santos[1], Igor Macedo Tavares Correia[2], Leandro Alberto Calazans Nogueira[2], Ney Meziat-Filho[2], Felipe José Jandre Reis[3,4,5]

DOI 10.5935/2595-0118.20220069-en

ABSTRACT

BACKGROUND AND OBJECTIVES: Low-quality online health-related content may lead to ineffective or harmful decision-making from patients related to their healthcare. The aim of this study was to evaluate the credibility, accuracy and readability of web-based content on Brazilian websites.
METHODS: This is a mixed-method review with exploratory sequential design. Google was selected as the search engine for retrieving web-information about low back pain (LBP) in Brazilian websites. We assessed the URL on three domains: credibility, accuracy, and readability. Qualitative analysis of each URL was performed in three steps: (1) organization into thematic units; (2) data exploration; and (3) interpretation of the data and summarization.
RESULTS: Credibility was assessed in 135 URLs, 72 (53%) URLs had no authorship, 119 (88%) did not mention the sources of their information, none presented a declaration of conflict of interest or the declared source of funding, 76 (56%) URLs present the date of creation. Accuracy was assessed in 121 URLs and none fully adhered to the guidelines. Readability was assessed in 128 and texts were classified as "very easy" or "easy" to read. Five main themes emerged in the qualitative analysis: (1) Explanations and causes for low back pain, (2) diagnosis, (3) recommendation about treatment, (4) recommendation for coping and self-management, and (5) lifestyle factors.
CONCLUSION: Content analysis of web-based searches on the Brazilian Portuguese language demonstrated low credibility standards, mostly inaccurate information, and moderate-high readability levels about low back pain.
Keywords: Access to information, Consumer health information, Information dissemination, Low back pain, Medical informatics.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O conteúdo on-line relacionado à saúde quando apresenta baixa qualidade pode levar a tomadas de decisão ineficazes ou prejudiciais por parte dos pacientes. O objetivo deste estudo foi avaliar a credibilidade, acurácia e legibilidade do conteúdo em portais brasileiros.
MÉTODOS: Esta é uma revisão de método misto com design sequencial exploratório. O Google foi selecionado como o mecanismo de busca para recuperar informações da web sobre dor lombar em sites brasileiros. Avaliamos os URL em três domínios: credibilidade, acurácia e legibilidade. A análise qualitativa de cada URL foi realizada em três etapas: (1) organização em unidades temáticas; (2) exploração de dados; e (3) interpretação dos dados e resumo.
RESULTADOS: A credibilidade foi avaliada em 135 URLs, 72 (53%) URLs não tinham autoria, 119 (88%) não mencionavam as fontes de suas informações, nenhuma apresentava declaração de conflito de interesse ou fonte de financiamento declarada, 76 (56%) URLs apresentam a data de criação. A acurácia foi avaliada em 121 URLs e nenhuma aderiu totalmente às diretrizes. A legibilidade foi avaliada em 128 e os textos foram classificados como "muito fáceis" ou "fáceis" de ler. Cinco temas principais emergiram na análise qualitativa: (1) Explicações e causas da dor lombar, (2) diagnóstico, (3) recomendação sobre tratamento, (4) recomendação para enfrentamento e autogerenciamento e (5) fatores de estilo de vida.
CONCLUSÃO: A análise de conteúdo de pesquisas baseadas na web, no idioma português do Brasil, demonstrou baixos padrões de credibilidade, acurácia e níveis moderados a altos de legibilidade sobre a dor lombar.
Descritores: Acesso à informação, Disseminação da informação, Dor lombar, Informação de saúde ao consumidor, Informáticas médicas.

Thamires Prazeres Alonso – https://orcid.org/0000-0001-5095-0782;
Raiany Pires dos Santos – https://orcid.org/0000-0003-1704-5267;
Igor Macedo Tavares Correia – https://orcid.org/0000-0003-2307-753X;
Leandro Alberto Calazans Nogueira – https://orcid.org/0000-0002-0177-9816;
Ney Meziat-Filho – https://orcid.org/0000-0003-2794-7299;
Felipe José Jandre Reis – https://orcid.org/0000-0002-9471-1174.

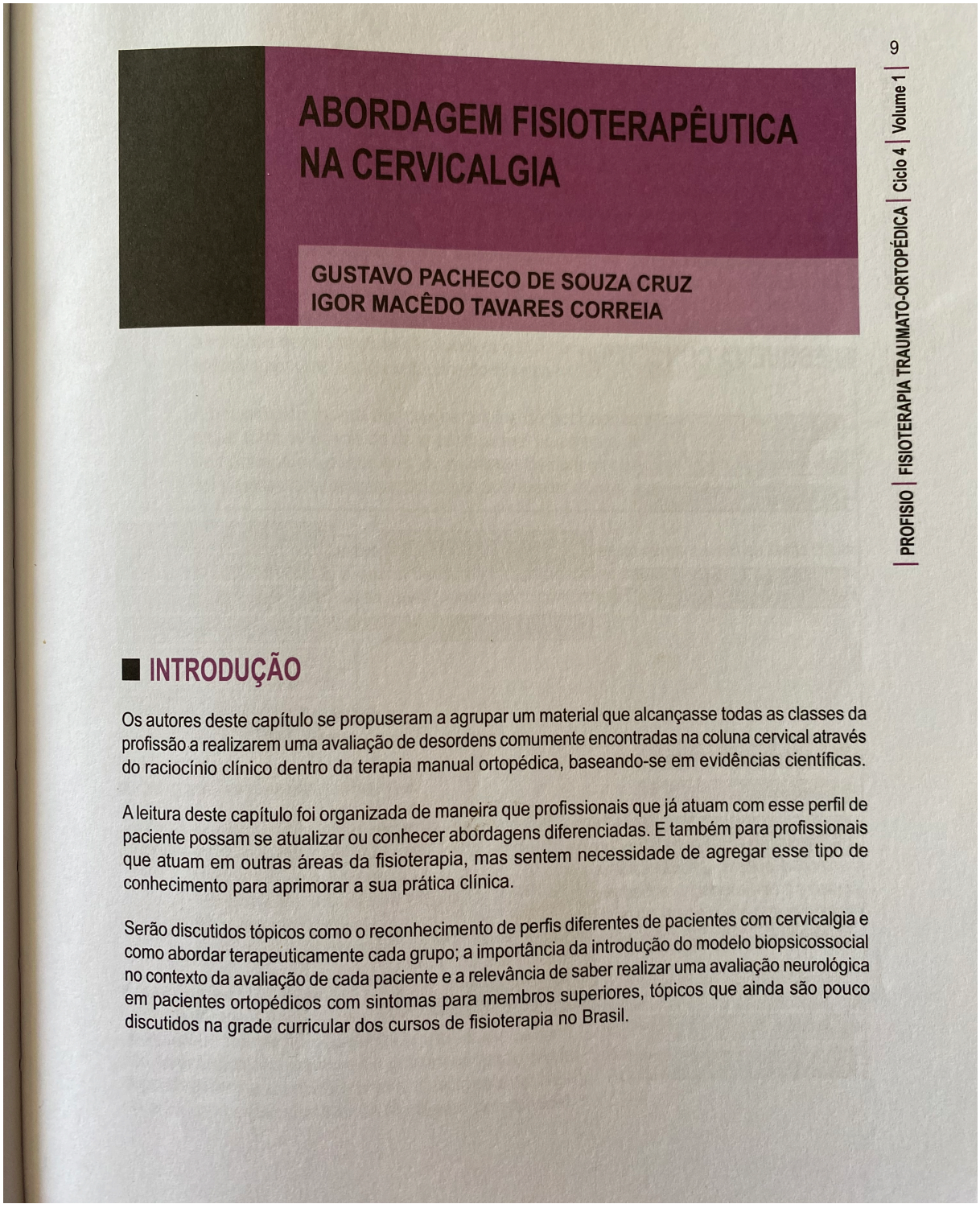
1. Brazilian Institute of Rehabilitation Medicine, Physical Therapy, Rio de Janeiro, RJ, Brazil.
2. University Center Augusto Motta, Postgraduation Program in Rehabilitation Sciences, Rio de Janeiro, RJ, Brazil.
3. Federal Institute of Rio de Janeiro, Physical Therapy Department, Rio de Janeiro, RJ, Brazil.
4. Vrije Universiteit, School of Physical Education & Physical Therapy, Brussels, Belgium.
5. Federal University of Rio de Janeiro, Postgraduation Program in Clinical Medicine, Rio de Janeiro, RJ, Brazil.

Submitted on December 09, 2022.
Accepted for publication on January 13, 2023.
Conflict of interest: none – Sponsoring sources: none

HIGHLIGHT
• Information about low back pain in Brazilian websites failed to meet guideline-endorsed recommendations.

Correspondence to:
Felipe José Jandre Reis
E-mail: felipe.reis@ifrj.edu.br

Cruz GPS, **Correia IMT**. Abordagem fisioterapêutica na cervicalgia. In: Associação Brasileira de Fisioterapia Traumato-Ortopédica; Silva MF, Barbosa RI, organizadores. PROFISIO Programa de Atualização em Fisioterapia Traumato-Ortopédica: Ciclo 4. Porto Alegre: Artmed Panamericana; 2020. P.9-60. (Sistema de Educação Continuada a Distancia, v.1).



ABORDAGEM FISIOTERAPÊUTICA NA CERVICALGIA

GUSTAVO PACHECO DE SOUZA CRUZ
IGOR MACÊDO TAVARES CORREIA

INTRODUÇÃO

Os autores deste capítulo se propuseram a agrupar um material que alcançasse todas as classes da profissão a realizarem uma avaliação de desordens comumente encontradas na coluna cervical através do raciocínio clínico dentro da terapia manual ortopédica, baseando-se em evidências científicas.

A leitura deste capítulo foi organizada de maneira que profissionais que já atuam com esse perfil de paciente possam se atualizar ou conhecer abordagens diferenciadas. E também para profissionais que atuam em outras áreas da fisioterapia, mas sentem necessidade de agregar esse tipo de conhecimento para aprimorar a sua prática clínica.

Serão discutidos tópicos como o reconhecimento de perfis diferentes de pacientes com cervicalgia e como abordar terapeuticamente cada grupo; a importância da introdução do modelo biopsicossocial no contexto da avaliação de cada paciente e a relevância de saber realizar uma avaliação neurológica em pacientes ortopédicos com sintomas para membros superiores, tópicos que ainda são pouco discutidos na grade curricular dos cursos de fisioterapia no Brasil.

Participação em Eventos:

UNISUAM

No Association Between Text Neck and Neck Pain in Adults: a Longitudinal Study

2021 BACK & NECK PAIN FORUM

207

Igor Macedo Tavares Correia[1] PhD student , Arthur de Sá Ferreira[1] PhD, Jessica Fernandez[1] PhD student, Tatiana Grasser[1] PhD student, Felipe José Jandre Reis[2-4] PhD , Leandro Alberto Calazans Nogueira[1,2] PhD, Ney Meziat-Filho[1] PhD

[1]Postgraduate Program in Rehabilitation Sciences – UNISUAM, Rio de Janeiro, Brazil., [2]Instituto Federal do Rio de Janeiro, [3]Universidade Federal do Rio de Janeiro, [4]Pain in Motion Research Group

BACKGROUND

The term text neck has arisen, being defined as the "detrimental" posture of cervical flexion adopted while using smartphones.

AIM

To investigate the association between text neck and neck pain in adults.

METHODS

The sample was composed of 396 volunteers without neck pain aged between 18 and 65 years. Sociodemographics, anthropometrics, lifestyle (physical activity level, smoking habits, sleep quality), psychosocial (anxiety, depression, social isolation), and smartphone use-related questions were assessed by a self-reported questionnaire. Text neck was assessed by measuring the cervical flexion angle of the participants standing while typing a text on their Smartphones, using the Cervical Range of Motion (CROM) device on baseline (figure 1). Two questions were used to assess the point prevalence and frequency of neck pain

METHODS

one year after the baseline: "Have you had neck pain today?" With the following "yes" or "no" answer options and "How often do you have neck pain?", the response options were "very often," "often," "occasionally,""rarely," and "never.

Figure 1

RESULTS

Of the total, 84.6% (n=335) of the participants completed the one-year follow up. Neck pain was reported by 10.1% (n=40) of the sample. The mean of the cervical flexion angle of the standing participant using a smartphone was 34.23 degrees (SD=12.15).

RESULTS

Multiple logistic regression analysis showed that **cervical flexion angle of the standing participant using a smartphone did not associate with neck pain (OR=1.01; 95% CI: 0.98–1.04; p=0.64) or frequency of neck pain (OR=1.01; 95% CI: 0.99–1.03; p=0.44) one year after the baseline.** Of the potential confounders, sleep quality was associated with neck pain (OR=1.76; 95% CI: 1.18–2.62; p=0.006) and frequency of neck pain (OR=1.53, 95% CI: 1.19–1.96; p=0.001). When compared to active, insufficiently active participants presented an increased odds of of neck pain (OR=2.42; 95% CI: 1.04–5.63; p=0.04).

CONCLUSION

Text neck was not associated with neck pain or frequency of neck pain in adults, These results challenge the belief that inadequate neck posture while using smartphones leads to neck pain and can help mitigate the impact of negative information regarding the cervical spine..

ACKNOWLEDGEMENTS: FAPERJ

REFERENCES: Correia IMT, Ferreira AS, Fernandez J, Reis FJJ, Nogueira LAC, Meziat-Filho N. Association Between Text Neck and Neck Pain in Adults. Spine (Phila Pa 1976). 2021 May 1;46(9):571-578.
Damasceno GM, Ferreira AS, Nogueira LAC, Reis FJJ, Andrade ICS, Meziat-Filho N. Text neck and neck pain in 18-21-year-old young adults. Eur Spine J. 2018 Jun;27(6):1249-1254.

abrapg·ft

CERTIFICADO DE APRESENTAÇÃO

Certificamos que o trabalho dos autores

Igor Macedo Tavares Correia, Arthur de Sá Ferreira, Jessica Fernandez, Felipe José Jandre Reis, Leandro Alberto Calazans Nogueira, Ney Meziat-Filho

intitulado

ASSOCIAÇÃO ENTRE O "TEXT NECK" E DOR CERVICAL EM ADULTOS: UM ESTUDO LONGITUDINAL

foi apresentado na modalidade **E-poster eletrônico** no I Fórum Discente da Associação Brasileira de Pesquisa e Pós-graduação - Fisioterapia (ABRAPG-Ft) realizado de 19 a 21 de maio de 2023, online.

Dra. Aline Martins Toledo
Presidente do I Fórum discente da ABRAPG-Ft

Dra. Rosimeire Simprini Padula
Presidente da ABRAPG-Ft

I FÓRUM DISCENTE DA ABRAPG-FT

Certificado

COBRAF - Congresso Brasileiro de Fisioterapia

XXIV COBRAF
CONGRESSO BRASILEIRO DE FISIOTERAPIA

Certificamos que o trabalho: **Associação entre o "text neck" e dor cervical em adultos: um estudo longitudinal** de autoria de **Igor Correia, Arthur Ferreira, Jessica Fernandez Mosqueira Gomes, Felipe José Jandre dos Reis, Leandro Alberto Calazans Nogueira, Ney Meziat** foi apresentado na modalidade PÔSTER no **XXIV Congresso Brasileiro de Fisioterapia** realizado no período de 04 a 06 agosto de 2022 na cidade do Rio de Janeiro.

Rio de Janeiro, 06 de agosto de 2022

Dra. Denise Flávio de Carvalho Botelho Lima
Presidente da AFB

Dra. Anke Bergmann
Presidente do XXIV COBRAF

Dra. Cristina Dias
Presidente da Comissão Científica do XXIV COBRAF

Certification by Galoá

UNILAVRAS

C E R T I F I C A D O

Certificamos que ***Igor Correia****, ministrou on-line a palestra intitulada:* ***"Text neck: fato ou fake?"****, realizada pelo Centro Universitário de Lavras, no dia 14 de dezembro de 2021, com carga horária de 02 horas.*

Lavras, 14 de dezembro de 2021.

Prof. Dr. Cássio Vicente Pereira
Pró-Reitor Acadêmico

Coordenadoria de Extensão – Expedição de Certificados
Livro: 24 | Protocolo: 1753 | Folha: 102

ABERGO 2023

XXIII CONGRESSO BRASILEIRO DE ERGONOMIA
XVI FÓRUM DE CERTIFICAÇÃO DO ERGONOMISTA BRASILEIRO
XVII FÓRUM DOS GRUPOS TÉCNICOS DA ABERGO

21 a 24 de novembro de 2023
Congresso Híbrido | Presencial no Majestic Palace Hotel | Florianópolis/SC

Certificamos que o trabalho intitulado **Definindo Text Neck - revisão de escopo** de autoria de Tatiana Grasser, Amabile Borges Dario, Patrícia do Carmo Silva Parreira, Igor Macedo Tavares Correia e Ney Meziat-Filho, foi apresentado e publicado no evento **ABERGO 2023**, realizado em 21/11/2023 a 24/11/2023, na cidade de Florianópolis.

Florianópolis, 24 de novembro de 2023.

Lucy Mara Baú
Presidente da ABERGO

Eduardo Ferro
Coordenador Científico

Lizandra Garcia Lupi Vergara
Coordenadora Local – UFSC

16º CBDOR
16º Congresso Brasileiro de Dor

Certificamos que:

JORGE ALBERTO ARRIGONI COELHO, NEY ARMANDO DE MELLO MEZIAT FILHO, IGOR MACEDO TAVARES CORREIA, LUCIANA CREPALDI LUNKES

Apresentou o pôster intitulado: "DOR CERVICAL E TEXT NECK: PREDOMÍNIO DO MODELO CINESIOPATOLÓGICO NA PRÁTICA CLÍNICA FISIOTERAPÊUTICA" no **16º Congresso Brasileiro de Dor**, realizado entre os dias 17 a 20 de maio de 2023, no centro de convenções Frei Caneca – São Paulo/SP.

José Oswaldo de Oliveira Junior
Presidente da SBED

Carlos Marcelo de Barros
Diretor Científico da SBED

Realização SBED

Eu me preocupo com a sua DOR

Certificado

COBRAF - Congresso Brasileiro de Fisioterapia

XXIV COBRAF
CONGRESSO BRASILEIRO DE FISIOTERAPIA

Certificamos que **Igor Macedo Tavares Correia** participou como **Moderador(a)** da Mesa Redonda TERAPIA MANUAL MANIPULATIVA COMO FERRAMENTA TERAPÊUTICA durante o **XXIV Congresso Brasileiro de Fisioterapia** realizado no período de 04 a 06 agosto de 2022 na cidade do Rio de Janeiro.

Rio de Janeiro, 06 de agosto de 2022

Dra. Denise Flávio de Carvalho Botelho Lima
Presidente da AFB

Dra. Anke Bergmann
Presidente do XXIV COBRAF

Dra. Cristina Dias
Presidente da Comissão Científica do XXIV COBRAF

Certificado

COBRAF - Congresso Brasileiro de Fisioterapia

XXIV COBRAF
CONGRESSO BRASILEIRO DE FISIOTERAPIA

Certificamos que o trabalho: **Prevalência de dores musculoesqueléticas e fatores associados em praticantes de futevôlei no Brasil** de autoria de **Igor Correia, Thiago da Silva Rocha Paz, Guilherme Pulcherio, Ney Meziat** foi apresentado na modalidade ORAL no **XXIV Congresso Brasileiro de Fisioterapia** realizado no período de 04 a 06 agosto de 2022 na cidade do Rio de Janeiro.

Rio de Janeiro, 06 de agosto de 2022

Dra. Denise Flávio de Carvalho Botelho Lima
Presidente da AFB

Dra. Anke Bergmann
Presidente do XXIV COBRAF

Dra. Cristina Dias
Presidente da Comissão Científica do XXIV COBRAF

Certification by Galoá

ABRAFIN
ASSOCIAÇÃO BRASILEIRA DE FISIOTERAPIA NEUROFUNCIONAL

CERTIFICADO

Conferimos o presente certificado a

Igor Macedo Tavares Correia

pela participação na qualidade de **MINISTRANTE** da palestra "Conceitos em Dor", durante o

V ENCONTRO CINTÍFICO DA ABRAFIN/RJ,

realizado em 25 de Março de 2023, das 8h às 17h, na sede do CREFITO-2.

Dra. Miriam Ribeiro Calheiros de Sá
Presidente da ABRAFIN

ABRAFIN
ASSOCIAÇÃO BRASILEIRA DE FISIOTERAPIA NEUROFUNCIONAL

CERTIFICADO

Conferimos o presente certificado a

Igor Macedo Tavares Correia

pela participação, na qualidade de **Membro da Comissão Organizadora**, do

VI ENCONTRO CIENTÍFICO DA ABRAFIN / RJ - Volta Redonda

realizado em 17 Junho de 2023, das 8h30min às 15h30min, no auditório do Hospital da UNIMED.

Dra. Miriam Ribeiro Calheiros de Sá
Presidente da ABRAFIN

CERTIFICADO

7º SIMPÓSIO PARADESPORTIVO CARIOCA

Declaro que

IGOR CORREIA

Participou da mesa redonda intitulada "Esporte e reabilitação da pessoa com deficiência" no **VII Simpósio Paradesportivo Carioca**, no dia 20 de setembro de 2023, na UNISUAM, Unidade Bonsucesso.

Patrícia dos Santos Vigário

PROFª PATRÍCIA VIGÁRIO
DOCENTE DO PROGRAMA DE PÓS-GRADUAÇÃO E CIÊNCIAS DA REABILITAÇÃO UNISUAM

CLAUDIA DE FREITAS LOPES COSTA
DIRETORA DE PESQUISA, EXTENSÃO E INOVAÇÃO

ACADEMIA PARALÍMPICA BRASILEIRA

FAPERJ

PROGRAMA DE CIÊNCIAS DA REABILITAÇÃO

Manuscrito(s) para Submissão

NOTA SOBRE MANUSCRITOS PARA SUBMISSÃO

Este arquivo contém manuscrito(s) a ser(em) submetido(s) para publicação para revisão por pares interna. O conteúdo possui uma formatação preliminar considerando as instruções para os autores do periódico-alvo. A divulgação do(s) manuscrito(s) neste documento antes da revisão por pares permite a leitura e discussão sobre as descobertas imediatamente. Entretanto, o(s) manuscrito(s) deste documento não foram finalizados pelos autores; podem conter erros; relatar informações que ainda não foram aceitas ou endossadas de qualquer forma pela comunidade científica; e figuras e tabelas poderão ser revisadas antes da publicação do manuscrito em sua forma final. Qualquer menção ao conteúdo deste(s) manuscrito(s) deve considerar essas informações ao discutir os achados deste trabalho.

Manuscrito #1: Text neck was not associated with neck pain in adults: a cross-sectional study

3.1.1 Contribuição dos autores do manuscrito para submissão #1

Iniciais dos autores, em ordem:	IC	AF	TG	FR	LN	NM
Concepção	x					x
Métodos	x	x	x	x	x	x
Programação		x				x
Validação	x					x
Análise formal	x		x			x
Investigação	x		x			
Recursos	x	x				
Manejo dos dados	x		x			x
Redação do rascunho	x					x
Revisão e edição	x	x	x	x	x	x
Visualização	x		x			x
Supervisão						x
Administração do projeto						x
Obtenção de financiamento						

Contributor Roles Taxonomy **(CRediT)**[4]

IC – IGOR CORREIA

AF – ARTHUR FERREIRA

TG – TATIANA GRASSER

RL – RODRIGO LARA

IA – IGOR ANDRADE

JF – JESSICA FERNANDEZ

FR – FELIPE REIS

LN – LEANDRO NOGUEIRA

NM – NEY MEZIAT

[4] Detalhes dos critérios em: https://doi.org/10.1087/20150211

Abstract

Introduction: Text neck defines the cervical flexion adopted when using mobile devices. The possible causal relationship between text neck and neck pain is still widely discussed by researchers and clinicians. **Objective:** Investigate the association between text neck and neck pain in adults. **Methods:** This is a cross-sectional study with 562 adults, with the application of a self-administered questionnaire with sociodemographic, anthropometric, lifestyle, psychosocial and related to neck pain and smartphone use issues. Text neck was assessed by blinded physiotherapists' judgment of neck posture on photographs of the participants during a smartphone texting message task in both sitting and standing postures. Logistic regression models were analyzed to investigate the association between text neck and the outcome neck pain, frequency or maximum intensity of neck pain. **Results**: Multivariable logistic and linear regression analyses showed text neck of the standing participant using a smartphone did not associate with the prevalence of neck pain (OR = 1.19; 95% CI 0.75 to 1.89; p = 0.45), neck pain frequency (OR = 0.93; 95% CI 0.64 to 1.67; p = 0.72) or maximum neck pain intensity (beta coefficient = -0.355; 95% CI: -0.73 to 0.06; p = 0.09). Also, text neck of the sitting participant using the smartphone did not associate with the prevalence of neck pain (OR = 0.83; 95% CI 0.53 to 1.29; p = 0.40) or maximum neck pain intensity (beta coefficient = 0.335; 95% CI: -0.73 to 0.06; p = 0.09) but was associated with a decrease in frequency of neck pain (OR = 0.68; 95% CI 0.46 to 0.99; p = 0.045). **Conclusions:** Text neck was not associated with prevalence of neck pain, maximum neck pain intensity or frequency of neck pain when participants were standing but was associated with a decrease in frequency of neck pain when the participants were sitting.

Key words: neck pain, cervical pain, posture, mobile phone.

Introduction

Neck pain (NP) is the fourth cause of disability in the world. It has been hypothesized that the flexed posture of the neck and head adopted for reading and typing while using smartphones—named text neck—is detrimental and related to neck pain and other physical symptoms [1]. Hansraj estimated that while in a neutral position the head weighs a relative 10-12lbs, compared to 27 lbs at 15 degrees, 40 lbs at 30 degrees, 49lbs at 45 degrees and 60lbs at 60 degrees [2]. However, three cross-sectional studies did not show an association between text neck and neck pain. Damasceno et al. did not find an association between text neck, assessed with a subjective photograph analysis, with neck pain or frequency of neck pain. Nonetheless, there were some limitations, such as a small sample (n=150) of participants, and restricted age range (18- to 21-years old) [3]. Correia et al. in a study with 582 volunteers (17- to 64-years old) evidenced that text neck, assessed objectively by cervical flexion angle, was not associated with neck pain, frequency of neck pain or maximum pain intensity in adults in standing and sitting positions [4]. Bertozzi et al. also found that there is no correlation between text neck and neck pain in young medical students (18- to 30-years old) [5].

The aim of this study was to investigate the association between text neck and neck pain building on our previous study of Damasceno et al. in a larger sample of adults and assessing text neck during sitting posture.

Methods

This is a cross-sectional study from the same cohort of participants of Correia et al. study enrolling 562 volunteers aged between 18 and 65 years, who had a smartphone and were willing to participate in research. Exclusion criteria were spinal surgery or any diseases that prevented the individual from adopting the unsupported orthostatic position. Individuals with significant cognitive impairment to the point of not understanding the self-completion questionnaire were excluded as well as individuals who did not own a smartphone. The study protocol followed the recommendations of The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement [6].

The study was previously approved by the Ethics Committee of the Augusto Motta University Center (approval number 3.030.275). All participants signed an informed consent term after being informed about the nature of the study and the protocol.

Self-completion questionnaire

Participants answered a self-reported questionnaire with sociodemographic (name, age and sex) and anthropometric (body mass and height) questions. Daily smartphone usage duration was assessed with the following question: “On a typical weekday, how many hours per day do you spend reading, texting and playing games on your smartphone?” Nine response options were offered, the first started with “I only use the smartphone to talk” and then the responses ranged from “less than 1 hour per day” to “about 7 or more hours per day”. Regarding possible visual problems we asked the following questions: “Do you have vision problems?” (yes or no) and “Do you have sight problems and wear glasses or contact lens?” (yes, no or I wear them, but I forgot them). Questions about posture concerns were: “Do you worry about your body posture?”, “Do you think your posture is appropriate when typing text on a cell phone?” and “Do you worry about your posture while using your cell phone when you type a text?” the answer options followed a five-level Likert scale “very often”, “often”, “occasionally”, “rarely” and “never”.

Two questions were used to assess the point prevalence and frequency of neck pain: “Are you experiencing neck pain today?” (yes or no) and “How often do you have neck pain?” (very often, often, occasionally, rarely and never). For the multivariable analysis, a dichotomized variable was created: “very often”/“often”/“occasionally” versus “rarely”/”never”. Maximum pain intensity was assessed with a 0 to 10 numerical rating scale, and the instruction: “Indicate (with an x) the highest pain you have ever had in your neck.” About the impact of neck pain, it was asked “Have you ever missed work due to neck pain?”, “Has neck pain taken you out of a sport?” and “Have you ever visited a doctor or physical therapist because of neck pain?” For all these questions the following five-level Likert-type items were: “very often”, “often”, “occasionally”, “rarely” and “never”.

The smartphone dependence was investigated using the short version of the Smartphone Dependency Scale. The total score ranges from 10 (minimum) to 60 (maximum), with the higher score indicating a higher chance of dependence on smartphone use [7].

The variables anxiety, social isolation and depression were assessed by applying the short psychosocial questionnaire [8]. There were four questions as follows: anxiety - “Do you feel anxious?” (anxiety), "Do you feel socially isolated?" (social isolation). Answer options ranged from 0 (“no, not at all”) to 10 (“fairly”). Depression was assessed by the following questions: “During the past month, have you often been bothered by feeling down, depressed or hopeless?” and “During the past month, have you often been bothered by little interest or pleasure in doing things?” with response options ranging from 0 (“never”) to 10 (“all the time”). We included a fifth question about stress: “Do you feel stressed?” With response options ranging from 0 (“no stress”) to 10 (“very stressed”).

Lifestyle evaluation encompassed physical activity, smoking habits, and sleep quality. Physical activity was assessed through the short-form International Physical Activity Questionnaire that classifies the individual as sedentary, insufficiently active, active or very active [9]. Smoking habits were assessed by asking, “In the last 30 days, how many days did you smoke?” with eight response options ranging from “never smoked” to “every day for the last 30 days”. Based on the Subjective Health Complaints [10], sleep quality was assessed with the following question: “Did you have trouble sleeping in the last month?” with four answer options “nothing, a little, some or seriously”.

Photographic analysis

Participants were positioned in an area with the floor marked. We took two photographs while participants remained in orthostatic and seated postures. During each posture we asked participants to send a text message to someone via their smartphone, as most similar to their everyday use (figure 1).

The photographs were stored in a cloud database and sent to two evaluators with more than 10 years of clinical experience in musculoskeletal physiotherapy. In case of disagreements, a third evaluator with more than 10 years of experience was available. The

evaluators were instructed to classify the posture adopted in the photographs as “normal” (= 1), “acceptable” (= 2), “inappropriate” (= 3) and “excessively inappropriate” (= 4). Then, a dichotomized variable ("1" or "2" – [no text neck] versus "3" or "4" [text neck]) was created for each analysis of the evaluating physiotherapists.

Figure 1: No text neck in standing posture; No text neck in sitting posture; Text neck in standing posture; Text neck in sitting posture.

Sample size

The minimum sample size required for this study was 519 participants, considering a prevalence of neck pain of 33% in the participants classified as text neck versus 17% in the participants without text neck classification, with an alpha of 5% and a power of 80%.

Statistical analysis

All analyses were performed with R version 4.3.2. Sample characteristics were described using proportions, means and standard deviations. Multivariable logistic and linear regression models were analyzed to investigate the association between text neck–assessed through subjective analysis of the photographs–during text entry for sending messages via

smartphone and the prevalence of neck pain, frequency and maximum intensity of neck pain. Potential confounders (age, sex, height, body mass, cell phone use time, visual problems, smoking, dependence on smartphone use, physical activity level, anxiety, depression, sleep quality, and social isolation) with a $p<0.2$ in the univariate analysis were also included in the regression models. The significance level adopted in the study was 5%.

Results

Our sample consisted of 72.4% women (n=407), with a mean age of 27.5 (SD = 8.9) years. Most participants (67.8%, n=81) reported at least 4 hours per day of smartphone use. More than half of participants (53.9%, n=303) reported some visual problem, and 45.9% (n=258) wore glasses or contact lenses. Almost half of the sample (46.4%, n=261) reported worrying about posture occasionally and 36.7% (n=206) during smartphone use. With respect to lifestyle, 9.6% (n=54) of the participants were classified as sedentary, followed by insufficiently active (22.6%, n=127), active (41.2%, n=232) and very active (26.5%, n=149). Additionally, only 15.4% (n=87) of participants reported smoking habits and 11.5% (n=65) reported serious problems with sleep (Table 1).

Table 1. Characteristics of the participants (n=562).

Age (years), mean (SD)	27.51 (8.95)	Text neck standing (photograph analysis), n (%)	224(39.86)
Sex, n female (%)	407(72.42)	Text neck sitting (photograph analysis), n (%)	197(35.10)
Body mass (kg), mean (SD)	69.56 (16.14)	Neck pain, n (%)	121(21.53)
Height (cm), mean (SD)	165.93(9.49)	Neck pain frequency, n (%)	
Physical activity level, n (%)		Very often	40(7.12)
Sedentary	54(9.61)	Often	86(15.30)
Insufficiently active	127(22.60)	Occasionally	203(36.12)
Active	232(41.28)	Rarely	179(31.85)
Very active	149(26.51)	Never	54(9.61)
Smoking, n smokers (%)	87(15.48)	Maximum neck pain intensity, mean (SD)	4.52(2.31)
Smartphone use time, n (%)		Missed school due to neck pain, n (%)	
I only use the smartphone to talk	8(1.42)	Very often	22(3.91)
Less than one hour a day	15(2.69)	Often	2(0.35)
About 1 hour a day	23(4.09)	Occasionally	13(2.31)
About 2 hours a day	59(10.49)	Rarely	30(5.34)
About 3 hours a day	76(13.52)	Never	495(88.08)
About 4 hours a day	77(13.70)	Missed sports due to neck pain, n (%)	
About 5 hours a day	67(11.92)	Very often	21(3.73)
About 6 hours a day	72(12.81)	Often	10(1.78)
About 7 hours a day or more	165(29.36)	Occasionally	40(7.12)
Visual impairments, n (%)	303(53.91)	Rarely	83(14.77)
Glasses or lens use, n (%)	258(45.98)	Never	408(72.60)
Worry about posture, n (%)		Went to a doctor or physiotherapist, n (%)	
Very often	61(10.85)	Very often	24(4.27)
Often	162(28.82)	Often	13(2.31)
Occasionally	261(46.44)	Occasionally	30(5.34)
Rarely	61(10.85)	Rarely	44(7.83)
Never	17(3.02)	Never	451(80.25)

		Smartphone dependence (SAS), mean (SD)	31,66(9.85)
		Anxiety (0-10), mean (SD)	6.6(2.74)
Smartphone adequate posture, n (%)			
Very often	10(1.78)		
Often	42(7.47))	Social isolation (0-10), mean (SD)	2.46(2.72)
Occasionally	194(34.52)	Depression (0-10), mean (SD)	4.01(3.26)
Rarely	195(34.70)	Stress (0-10), mean (SD)	5.81(3.04)
Never	121(21.53)	Sleep problems, n (%)	
Worry about smartphone posture, n (%)		Nothing	161(28.70)
Very often	18(3.21)	A little	190(33.87)
Often	68(12.12)	Some	145(25.85)
Occasionally	206(36.72)	Serious	65(11.58)
Rarely	170(30.30)		
Never	99(17.65)		

The prevalence of neck pain was 21.5% (n=121). Regarding frequency of neck pain, 7.1% (n=40) complained very often, 15.3% (n=86) often, 36.1% (n=203) occasionally, 31.8% (n=179) rarely and 9.6% (n=54) never complained. The mean of maximum neck pain intensity was 4.52 (SD=2.31). Of the total sample, 88% (n=495) never missed school or work, 72.6% (n=408) never missed sports, and 80.2% (n=451) never visited a doctor or physiotherapist due to neck pain. As a binary variable (‘1’ or ‘2’ = 1; ‘3’ or ‘4’ = 2), the physiotherapists’ judgment (agreement of at least two opinions) classified 39.8% (n=224) of the participants standing and 35.1% (n=197) sitting as a text neck.

Multivariable logistic regression analyses showed that text neck while standing was not associated with neck pain (OR = 1.19; 95% CI 0.75 to 1.89; p = 0.45) or frequency of neck pain (OR = 0.93; 95% CI 0.64 to 1.67; p = 0.72) (Table 2). Text neck while sitting was not associated with the prevalence of neck pain (OR = 0.83; 95% CI 0.53 to 1.29; p = 0.40) but was associated with a decrease in frequency of neck pain (OR = 0.68; 95% CI 0.46 to 0.99; p = 0.045) (Table 3).

Table 2. Odds ratio (OR) for the association between text neck while standing with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)			
	OR adjusted	95% CI	*p*-value	VIF**
Text neck, standing	1.19	0.75–1.89	0.453	1.08
Age	1.04	1.01–1.07	0.001	1.28
Sex (male)	0.84	0.49–1.42	0.514	1.37
Body mass	1.00	0.99–1.02	0.779	1.33
Smartphone use time	1.10	0.98–1.25	0.121	1.49
Smartphone dependence	1.01	0.99–1.04	0.266	1.48
Anxiety	1.03	0.94–1.13	0.569	1.43
Social isolation	1.06	0.97–1.15	0.185	1.36
Depression	1.01	0.93–1.10	0.812	1.88
Sleep quality	1.27	0.99–1.61	0.051	1.29
	Frequency of neck pain (model 2)			
	OR adjusted	95% CI	*p*-value	VIF**
Text neck, standing	0.93	0.64–1.67	0.721	1.14
Height	0.99	0.97–1.02	0.426	1.81
Sex (male)	0.63	0.37–1.07	0.089	1.89
Sleep quality	1.17	0.95–1.43	0.136	1.25
Smartphone use time	1.04	0.95–1.14	0.432	1.31
Smartphone dependence	1.02	0.99–1.04	0.091	1.46
Anxiety	1.05	0.97–1.13	0.246	1.40
Social isolation	1.05	0.98–1.13	0.235	1.30
Depression	1.01	0.94–1.08	0.848	1.79

** Variance inflation factor

Table 3. Odds ratio (OR) for the association between text neck while sitting with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)			
	Adjusted OR	95% CI	*p*-value	VIF**
Text neck, sitting	0.83	0.53–1.29	0.401	1.08
Age	1.04	1.02–1.07	0.001	1.28
Sex (male)	0.74	0.41–1.32	0.304	1.38
Body mass	1.00	0.99–1.02	0.779	1.33
Smartphone use time	1.10	0.98–1.25	0.121	1.49
Smartphone dependence	1.01	0.99–1.04	0.266	1.48
Anxiety	1.03	0.94–1.13	0.569	1.43
Social isolation	1.06	0.97–1.15	0.185	1.36
Depression	1.01	0.93–1.10	0.812	1.88
Sleep quality	1.27	0.99–1.61	0.051	1.29
	Frequency of neck pain (model 2)			
	Adjusted OR	95% CI	*p*-value	VIF**
Text neck, sitting	0.68	0.46–0.99	0.045	1.07
Height	0.99	0.97–1.02	0.508	1.80
Sex (male)	0.58	0.34–0.99	0.047	1.88
Sleep quality	1.15	0.94–1.41	0.175	1.25
Smartphone use time	1.03	0.94–1.13	0.518	1.31
Smartphone dependence	1.02	0.99–1.04	0.124	1.44
Anxiety	1.05	0.97–1.31	0.227	1.39
Social isolation	1.05	0.97–1.13	0.219	1.30
Depression	1.01	0.94–1.09	0.821	1.79

**Variance inflation factor

Multivariable linear regression analyses showed that text neck while standing was not associated with maximum neck pain intensity (β = -0.355; 95% CI: -0.73 to 0.06; p = 0.09) (table 4). Text neck while sitting was not associated with maximum neck pain intensity (β = 0.335; 95% CI: -0.73 to 0.06; p = 0.09) (Table 5).

Table 4. Beta coefficients for the association between text neck while standing and maximum neck pain intensity, considering potential confounders.

	Maximum neck pain intensity (0–10)			
	Adjusted β	95% CI	*p*-value	VIF**
Text neck, standing	-0.355	-0.731–0.060	0.096	1.14
Age	0.024	0.002–0.047	0.034	1.24
Height	0.001	-0.025–0.027	0.926	1.82
Sex (male)	-0.153	-0.721–0.416	0.599	1.96
Sleep quality	0.334	0.123–0.546	0.001	1.32
Smartphone use time	0.117	0.014–0.219	0.026	1.48
Smartphone dependence	0.027	0.003–0.049	0.023	1.53
Anxiety	0.042	-0.038–0.112	0.304	1.46
Social isolation	0.031	-0.046–0.109	0.428	1.35
Depression	0.030	-0.047–0.108	0.441	1.94
Physical activity (sedentary)	0.416	0.019–0.813	0.039	1.04
Vision problems	0.324	-0.062–0.710	0.099	1.13

**Variance inflation factor

Table 5. Beta coefficients for the association between text neck while sitting and maximum neck pain intensity, considering potential confounders.

	Maximum pain intensity (0–10)			
	Adjusted β	95% CI	*p*-value	VIF**
Text neck, sitting	0.335	-0.060–0.731	0.096	1.14
Age	0.024	0.001–0.047	0.034	1.25
Height	0.001	-0.025–0.027	0.926	1.82
Sex (male)	-0.152	-0.721–0.416	0.599	1.96
Sleep quality	0.334	0.123–0.546	0.002	1.32
Smartphone use time	0.116	0.014–0.219	0.026	1.48
Smartphone dependence	0.027	0.004–0.049	0.023	1.53
Anxiety	0.042	-0.038–0.122	0.304	1.46
Social isolation	0.031	-0.046–0.109	0.428	1.35
Depression	0.030	-0.047–0.108	0.441	1.94
Physical activity (sedentary)	0.416	0.194–0.813	0.039	1.05
Vision problems	0.324	-0.062–0.710	0.999	1.13

**Variance inflation factor

The only potential confounder that remained associated with prevalence of neck pain in the multivariable model was age (OR = 1.04; 95% CI 1.01 to 1.07; p = 0.001). For neck pain frequency outcome, the variable that remained associated with a decrease in frequency of neck pain when the participants were sitting was sex (OR = 0.58; 95% CI 0.34 to 0.99; p = 0.047). For maximum pain intensity outcome, the five variables that remained associated were age (beta coefficient = 0.024; 95% CI 0.002 to 0.047; p = 0.034), sleep quality (β = 0.334; 95% CI 0.123 to 0.546; p = 0.001), smartphone use time (β = 0.117; 95% CI 0.014 to 0.219; p = 0.026), smartphone dependence (β = 0.027; 95% CI 0.003 to 0.049; p = 0.023) and physical activity (sedentary) (β = 0.416; 95% CI 0.019 to 0.813; p = 0.039).

Discussion

The present study showed that text neck, with a subjective assessment of postures standing and sitting while using the smartphone by experienced musculoskeletal

physiotherapists, was not associated with an increase in prevalence of neck pain, neither maximum neck pain intensity nor frequency of neck pain in both standing and sitting. The current results corroborate the findings of Damasceno et al. and reinforces the findings of Correia et al. and Bertozzi et al., in which the association between text neck – objectively assessed through cervical flexion angle during the use of smartphones – and neck pain was not found.

Surprisingly, text neck was associated with a decrease on frequency of neck pain when participants were sitting. One hypothesis is that asymptomatic people use to relax neck extensor muscles and visit neck flexion range more often than people with neck pain. Shamsi et al. showed that people with chronic neck pain do not completely relax the erector muscles when they flex their cervical spine when compared to asymptomatic people [11]. This is called flexion–relaxation phenomenon that would be a plausible explanation for finding this result in cross-sectional studies. However, in a longitudinal study, Richards et al. found that women in late adolescence who sat in slumped thorax/forward head or intermediate posture rather than upright sitting posture had a lower risk of persistent neck pain as a young adult [12].

Our findings contradict the hypothesis raised by Hansraj study. Data from mechanical load on the necks of cadavers showed a resistance of up to 540 lb or 244.94 kg, nine times higher than mentioned by Hansraj [2]. Moreover, the authors state that in living people the resistive and adaptive capacity of the cervical spine would be even higher [13]. These are aspects of structural biomechanics, but given that pain is multidimensional, it is possible that neck pain would be influenced by other biopsychosocial factors [14].

There were some potential confounders associated with neck pain outcomes in the present study. Male sex was associated with a decrease in frequency of neck pain which seems to be in accordance with the literature [15]. The large sample size made it possible to identify weak statistically significant association between age and increased prevalence of neck pain; and the association of physical activity, sleep quality, smartphone use time, smartphone dependence with maximum pain intensity.

The strengths of the present study are a larger sample size, the assessment of text neck in sitting posture, a range of potential biopsychosocial confounders and a sample with a higher average age. The main limitation of this study was that the question of whether the

participants started to adopt a better posture after having neck pain could only be responded to with longitudinal studies. Another limitation was that we assessed the point prevalence of neck pain without differentiating between acute and chronic stages. Although participants were on average 10 years older than the ones on Damasceno et al. study, the sample of the present study was still young.

This study contributes to the existing literature suggesting that text neck is not associated to neck pain. Despite this corroborating evidence, excessive focus on postural changes during smartphone usage is still prompted in media and academia. It is important to highlight that such causal relation—based on injury or structural changes—contributes to hypervigilance, fear, catastrophic thoughts and seek for medical care [16,17]. The results of the present study can help lessen the impact of negative information regarding text neck and emphasize that the cervical spine is much stronger and resilient than has been claimed in the general media.

Conclusion

Text neck was not associated with the prevalence of neck pain or maximum neck pain intensity but was associated with a decrease in frequency of neck pain when the participants were sitting. These results challenge the belief that inadequate neck posture while using smartphones leads to neck pain.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Hoy D, March L, Woolf A, et al. The global burden of neck pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis* 2014; 73: 1309–1315.

2. Hansraj KK. Assessment of stresses in the cervical spine caused by posture and position of the head. *Neuro and Spine Surgery* 2014; 25: 277–9.

3. Damasceno GM, Ferreira AS, Nogueira LAC, et al. Text neck and neck pain in 18–21-year-old young adults. *European Spine Journal*. Epub ahead of print 2018. DOI: 10.1007/s00586-017-5444-5.

4. Correia IMT, Ferreira A de S, Fernandez J, et al. Association Between Text Neck and Neck Pain in Adults. *Spine (Phila Pa 1976)*; Publish Ah. Epub ahead of print 2020. DOI: 10.1097/brs.0000000000003854.

5. Bertozzi L, Negrini S, Agosto D, et al. Posture and time spent using a smartphone are not correlated with neck pain and disability in young adults: A cross-sectional study. *J Bodyw Mov Ther* 2021; 26: 220–226.

6. Elm E von, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol* 2008; 61: 344–349.

7. Mescollotto FF, Castro EM de, Pelai EB, et al. Translation of the short version of the Smartphone Addiction Scale into Brazilian Portuguese: cross-cultural adaptation and testing of measurement properties. *Braz J Phys Ther* 2019; 23: 250–256.

8. Kent P, Mirkhil S, Keating J, et al. The Concurrent Validity of Brief Screening Questions for Anxiety , Depression , Social Isolation , Catastrophization , and Fear of Movement in People With Low Back Pain. Clin J Pain. 2014; 30: 479–489.

9. Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-Country reliability and validity. *Med Sci Sports Exerc* 2003; 35: 1381–1395.

10. Eriksen HR, Ihleb C, Ursin H. A scoring system for subjective health complaints (SHC). *Scand J Public Health* 1999; 27: 63–72.

11. Shamsi H, Khademi-Kalantari K, Akbarzadeh-Baghban A, et al. Cervical flexion relaxation phenomenon in patients with and without non-specific chronic neck pain. *J Back Musculoskelet Rehabil* 2021; 1: 1–8.

12. Richards K v, Beales DJ, Smith AL, et al. Is Neck Posture Subgroup in Late Adolescence a Risk Factor for Persistent Neck Pain in Young Adults? A Prospective Study. *Phys Ther*; 101. Epub ahead of print 3 March 2021. DOI: 10.1093/ptj/pzab007.

13. Przybyla AS, Skrzypiec D, Pollintine P, et al. Strength of the Cervical Spine in Compression and Bending. *Spine (Phila Pa 1976)* 2007; 32: 1612–1620.

14. Richards K v, Beales DJ, Smith AJ, et al. Neck Posture Clusters and Their Association With Biopsychosocial Factors and Neck Pain in Australian Adolescents. *Phys Ther* 2016; 96: 1576–1587.

15. Hoy DG, Protani M, De R, et al. The epidemiology of neck pain. *Best Pract Res Clin Rheumatol* 2010; 24: 783–792.

16. Traeger AC, Moynihan RN, Maher CG. Wise choices: making physiotherapy care more valuable. *J Physiother* 2017; 63: 63–65.

17. O'Sullivan P, Caneiro JP, O'Keeffe M, et al. Unraveling the complexity of low back pain. *Journal of Orthopaedic and Sports Physical Therapy* 2016; 46: 932–937.

Manuscrito #2: Text neck is not associated with neck pain, but low sleep quality and insufficient physical activity are: a longitudinal study

3.1.2 Contribuição dos autores do manuscrito para submissão #2

Iniciais dos autores, em ordem:	IC	AF	JF	FR	LN	NM
Concepção	x					x
Métodos	x	x		x	x	x
Programação		x				x
Validação	x					x
Análise formal	x					x
Investigação	x		x			
Recursos	x	x				
Manejo dos dados	x		x			
Redação do rascunho	x					x
Revisão e edição	x	x	x	x	x	x
Visualização	x		x			x
Supervisão						x
Administração do projeto						x
Obtenção de financiamento						

Contributor Roles Taxonomy **(CRediT)**[5]

IC – IGOR CORREIA

AF – ARTHUR FERREIRA

JF – JESSICA FERNANDEZ

FR – FELIPE REIS

LN – LEANDRO NOGUEIRA

NM – NEY MEZIAT

[5] Detalhes dos critérios em: https://doi.org/10.1087/20150211

SUMMARY

Questions: Is there an association between text neck (TN) and neck pain (NP) or frequency of NP? Is there an association between psychosocial and lifestyle factors and NP or frequency of NP?

Design: A longitudinal study.

Participants: The sample consisted of 457 volunteers without NP aged between 18 and 65 years.

Measurements: Sociodemographic, anthropometric, lifestyle, psychosocial and smartphone use data were collected through a self-reported questionnaire. TN was assessed objectively at baseline by measuring the cervical flexion angle using the cervical range of motion device (CROM) with participants standing and sitting while texting on their smartphones. One year after the initial assessment, participants were assessed regarding the point prevalence and frequency of NP.

Outcome measures: Prevalence of NP and frequency of NP 12 months after baseline.

Results: Of the total, 396 (87%) participants completed the one-year follow-up. NP was reported by 40 (10%) participants at 12 months. Multiple logistic regression analysis showed that TN was not associated with NP (standing OR = 1.0 [0.97–1.04]; sitting OR = 1.01 [0.98–1.04]) or frequency of NP (standing OR = 1.01 [0 .99–1.03]; sitting OR = 1.00 [0.99–1.02]) 12 months after baseline. Low sleep quality (OR = 1.76 [1.17–2.63]) and insufficient level of physical activity (OR = 2.41 [1.03–5.65]) were associated with NP.

Conclusion: Text neck was not associated with NP or frequency of NP after 12 months of follow-up of adults initially without NP, contrary to low sleep quality and insufficient level of physical activity.

Key words: neck pain; smartphone; posture; text neck

Introduction

Neck pain (NP) is the fourth cause of disability in the world[1], being one of the main chronic conditions regarding years lived with disability in the age group between 25 and 74 years of age.[2] There is a hypothesis that the flexed posture of the neck and head adopted for reading and typing while using a smartphone – called “text neck” – is harmful and is related to neck pain and other physical symptoms. Recently, a scoping review[3] showed that the cervical flexion posture adopted during smartphone use is the defining characteristic of the term text neck. Brazil is ranked as one of the countries with the highest smartphone usage. Brazilian people spend 32% of their time awake on their smart phones daily. This percentage increases to 56%, approximately 9 hours and 32 minutes, taking into account the screen time of smartphones and computers combined.[4]

The relationship between NP and smartphone use emerged by one single computational model study which suggested the premise that the greater the neck flexion, the greater the overload.[5] This theory, based exclusively on biomechanics, does not consider that pain is modulated by several factors and must be underpinned in a multidimensional way.[6,7] Aspects such as depression, anxiety, sleep quality and level of physical activity are frequently described as risk factors for NP.[8–11] In fact, more risk factors are found in psychosocial than physical dimensions for a first episode of NP.[12]

Previous cross-sectional studies did not find an association between NP and “text neck”, with students aged 18 to 21[13] and among adults after quantitative assessment of cervical flexion with a CROM inclinometer in standing and sitting.[14] Bertozzi et al. (2020) also did not find an association between neck posture and time spent on smartphones with NP or disability.[15] A longitudinal study did not find an association between time spent texting on mobile devices and new cases of NP.[16] Furthermore, the same study showed that smartphone usage increases the risk of new cases of pain in the hand and fingers. To our knowledge, most studies are cross-sectional in nature. Therefore, it is important to understand whether these factors are also associated with NP in longitudinal studies. Hence, the objective of this study was to analyze the association between text neck and the presence and frequency of NP among adult individuals at a 12-month follow-up and investigate the influence of

psychosocial and lifestyle factors on NP in smartphone users.

Methods

Design

Longitudinal observational study with 12-month follow-up using a self-reported questionnaire and objective assessment of posture while texting in a smartphone using inclinometer measure at baseline. The follow-up evaluation was carried out after one year through telephone contact, via e-mail or social networks. This study followed the recommendations of the STROBE Guidelines - Strengthening the Reporting of Observational Studies in Epidemiology.[17]

Participants

The sample consisted of 457 volunteers recruited from a University Center in Brazil without neck pain, aged between 18 and 65 years of both sexes.

Assessment measures

At baseline, a questionnaire was applied containing identification of the research participant with sociodemographic (name, age and sex) and anthropometric (weight and height) questions. To exclude participants with neck pain at baseline, they were asked: “Do you have neck pain today?” the options of answers were: “Yes” or “No”. The amount of time the participant is exposed to smartphone use was assessed through the question “On a typical weekday, how many hours a day do you spend reading, texting and playing games on your smartphone?” with nine options of answers, the first of which began with “I only use my smartphone to talk” and then the answers varied according to the time spent using the cellphone from “Less than 1 hour per day” to “About 7 or more hours per day”. Regarding concerns about their own posture, we asked “Do you worry about your body posture?”, “Do you think your posture is adequate when typing on your smartphone?” and “Do you worry about your posture on your smartphone when typing?” the response options were “very often”, “often”, “once in a while”, “rarely” or “never”. We also evaluate visual problems, as the individual's posture can be altered due to the fact that they have compromised visual

acuity without the necessary corrections, so we ask “Do you have vision problems?”, with the answer option “Yes” or “No” and, also “Do you have vision problems and do you wear glasses (or contact lenses)?”, the answers were “Yes”, “No” or “I use them, but I forgot”.

Lifestyle was assessed with questions about physical activity, smoking, sleep quality and dependence on smartphone use. The short version of the International Physical Activity Questionnaire (IPAQ) assessed the level, weekly frequency and daily workload of activities, classifying the individual as: sedentary, insufficiently active, active or very active.[18] Smoking was assessed using the question “In the last 30 days, how many days did you smoke cigarettes?” with eight response options ranging from “I never smoked” to “every day in the last 30 days”. Sleep quality was assessed with the question: “Did you have trouble sleeping in the last month?” with four response options: “nothing”, “a little”, “some” or “seriously”. Furthermore, the questionnaire also included the Smartphone Addiction Scale[19] and psychosocial factors such as anxiety, depression, social isolation and stress.[20]

The flexion angle of the cervical spine was measured while typing on the smartphone using an inclinometer (CROM – Cervical Range of Motion). The reliability and validity of the CROM were established by Capuano-Pucci (1991)[21] and Tousignant (2006)[22], respectively. The CROM measures cervical range of motion for flexion and extension, lateral flexion and rotation using three separate inclinometers, each in a sagittal, frontal and transverse plane, respectively. We only assessed the cervical flexion degree.

The one-year follow-up was carried out by telephone contact and included only questions regarding the complaint of neck pain and the frequency of neck pain: “Do you have neck pain today?” The answer options were: “Yes” or “No” and frequency of neck pain: “How often have you had neck pain?” The response options were: “Very often”, “Often”, “Once in a while”, “Rarely” or “Never”. These responses were dichotomized for regression analysis into 1 – Never and Rarely and 2 – Occasionally, Often and Very often.

Data analysis

All analyzes were performed using version 0.99.486. from RStudio (https://posit.co). Participant characteristics were described using proportions, means and standard deviations. Four logistic regression models were carried out. The two first evaluated standing text neck, psychosocial variables (anxiety and depression) and lifestyle variables (level of physical activity and quality of sleep) as independent variables with prevalence of neck pain and frequency of neck pain as dependent variables, respectively. The two second ones evaluated sitting text neck and the same psychosocial and lifestyle variables as independent variables with the same dependent variables. Potential confounders, including age, sex, time using the device, and smartphone dependence, were included in the logistic regression models according to what the literature describes as potential risk factors for neck pain and variables related to smartphone use. The significance level adopted in the study was 5%.

Results

Of the total, 396 (87%) participants completed the one-year follow-up. The presence of NP on the day of reassessment was reported by 40 (10%) participants. The frequency of NP was “very often” in 4 (1%), “often” in 20 (5%), “occasionally” in 129 (33%), “rarely” in 158 (40%) and “never” in 85 (21%) volunteers. The average age was 27 (SD=9) years and 319 (70%) were female. The average cervical flexion angle of participants using the smartphone was 34º (SD=12º) in the standing posture and 36º (SD=14º) in the sitting posture. Time of use, level of physical activity, concerns about posture, smartphone dependence and other psychosocial factors are also described in Table 1.

Multiple logistic regression analysis showed that the cervical flexion angle of participants standing using a smartphone was not associated with NP (OR = 1.01; 95% CI: 0.97–1.04; p=0.71) or frequency of NP (OR = 1.01; 95% CI: 0.99–1.03; p=0.35) one year after baseline. Of the potential confounders, sleep quality was associated with NP (OR = 1.77; 95% CI: 1.18–2.64; p=0.005) and frequency of NP (OR = 1.55, CI 95 %: 1.21–2.00; p=0.001). When compared to active participants,

those who were insufficiently active had increased odds of NP (OR = 2.46; 95% CI: 1.05–5.75; p=0.038). Although it was not statistically significant, there is a suggestion that sedentary individuals have a greater chance of NP (OR = 2.39; 95% CI: 0.83–6.86; p=0.11) when compared to physically active participants (Table 2).

The same was observed with participants in a sitting posture while using a smartphone, not being associated with NP (OR = 1.01; 95% CI: 0.98-1.04; p=0.48) or frequency of NP (OR = 1.00; 95% CI: 0.99-1.02; p=0.59) one year after baseline. From the potential confounders, sleep quality was associated with NP (OR = 1.76; 95% CI: 1.17–2.63; p=0.006) and frequency of NP (OR = 1.55, CI 95 %: 1.21–1.99; p=0.001). When compared to active participants, those who were insufficiently active had increased odds of NP (OR = 2.41; 95% CI: 1.03–5.65; p=0.042). (Table 3)

Discussion

The present longitudinal study showed that “text neck” was not associated with NP or frequency of NP after 12 months. Thus, the cervical flexion angle adopted during the use of smartphones is not associated with NP. On the other hand, psychosocial factors such as level of physical activity and quality of sleep seem to be more relevant in NP.

These results corroborate the cross-sectional studies by Damasceno et al. (2018)[13] who evaluated the self-perception of the posture of 150 young people aged 18 to 21, Bertozzi et al. (2020)[15] who analyzed categories of pain and disability in 238 students aged 18 to 30 and Correia et al. (2021)[14] who evaluated 582 volunteers aged 18 to 65 years measuring the angle of the cervical spine while using a smartphone in standing and sitting positions, as none of them found an association between use and NP.

A longitudinal study with 686 participants showed that neck posture at age 17 was not a risk factor for persistent NP at age 22 in men, while in women, more relaxed postures were a protective factor for NP.[23] Pain is multifactorial and influenced by a complex interaction of biopsychosocial factors.[24–26] One of these factors we found an association with NP was sleep quality, individuals who reported problems sleeping had

an increased chance of having NP. Initial studies show that low-quality sleep can cause or increase the intensity of pain,[27] decreasing the threshold and tolerance levels[28] and that it can be a double pathway, where pain also leads to poor sleep quality.[29]

Another important factor that increased the chance of developing NP was the level of physical activity, in which insufficiently active individuals are more susceptible to pain compared to physically active individuals. While in the sedentary category the same association is suggested, although it is not statistically significant. Physical inactivity seems to be a mediator of the relationship between chronic pain and mortality.[30] While regular physical activity prevents hyperalgesia through the activation of opioids and serotonin producing analgesia, in addition to anti-inflammatory cytokines that reduce the activity of nociceptors. Physically active individuals commonly have better mental health and psychological well-being, while inactive individuals are more likely to experience depression and anxiety,[31–33] in addition to an increase in the likelihood of NP in young people.[10] Furthermore, in some manifestations of pain, there is no superiority between types of exercise, so, ideally these people should be encouraged to practice the exercise that brings them some pleasure to promote adherence.[34]

Some strengths of the study are the longitudinal design with 12-month follow-up, in addition to the potential biopsychosocial confounding factors included in the analysis. The main limitation of this study was the failure to differentiate between acute and chronic stages of NP. It is also important to highlight that the monitoring period for the participants took place during the COVID-19 pandemic in 2020, possibly leaving people to be more sedentary. This 12-month longitudinal study contributes to the existing literature on the topic by reinforcing the lack of association between the cervical flexion posture adopted during the use of smartphones – “text neck” – with the emergence or frequency of NP in adults. These results challenge the belief that inadequate neck posture during smartphone use leads to NP. This linear causal relationship reasoning based solely on injuries or structural changes to justify pain is outdated, other factors such as sleep quality and level of physical activity seem to be more relevant in NP.

What was already known about this topic: Cross-sectional studies show an absence of association between “text neck” and NP in adults who use smartphones. According to the biopsychosocial model, pain is also influenced by psychosocial factors and not just biomechanical factors. There is a lack of studies with a longitudinal design that evaluate this relationship between the cervical flexion posture adopted during smartphone use and NP.

What this study adds: This 12-month longitudinal study complements the existing literature on the field, reinforcing the lack of association between the cervical flexion posture adopted during the use of smartphones – “text neck” – with the episode or frequency of NP in adults. These results challenge the belief that poor neck posture during smartphone use leads to NP. Other factors such as sleep quality and physical activity level seem to be more relevant.

References

1. Hoy D, March L, Woolf A, et al. The global burden of neck pain: estimates from the global burden of disease 2010 study. *Ann Rheum Dis*. 2014;73(7):1309-1315. doi:10.1136/ANNRHEUMDIS-2013-204431

2. Abbafati C, Abbas KM, Abbasi M, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*. 2020;396(10258):1204-1222. doi:10.1016/S0140-6736(20)30925-9

3. Grasser T, Borges Dario A, Parreira PCS, Correia IMT, Meziat-Filho N. Defining text neck: a scoping review. *Eur Spine J*. 2023;32(10):3463-3484. doi:10.1007/S00586-023-07821-2

4. Kemp S. Digital 2023: Global Overview Report. Published January 26, 2023. Accessed May 31, 2023. https://datareportal.com/reports/digital-2023-global-overview-report

5. Hansraj KK. Assessment of stresses in the cervical spine caused by posture and position of the head. *Surg Technol Int*. 2014;25:277-279. Accessed December 17, 2023. https://europepmc.org/article/med/25393825

6. Richards K V., Beales DJ, Smith AJ, O’Sullivan PB, Straker LM. Neck Posture Clusters and Their Association With Biopsychosocial Factors and Neck Pain in Australian Adolescents. *Phys Ther*. 2016;96(10):1576-1587. doi:10.2522/PTJ.20150660

7. Meziat-Filho N, Grasser T, Correia I, Reis FJJ. Comment on: Text neck misdiagnosed as fibromyalgia. *Rheumatology*. 2023;62(6):e199-e200. doi:10.1093/RHEUMATOLOGY/KEAC642

8. Andias R, Silva AG. Psychosocial Variables and Sleep Associated With Neck Pain in Adolescents: A Systematic Review. *Phys Occup Ther Pediatr*. 2020;40(2):168-191. doi:10.1080/01942638.2019.1647328

9. Nijs J, D'Hondt E, Clarys P, et al. Lifestyle and Chronic Pain across the Lifespan: An Inconvenient Truth? *PM R*. 2020;12(4):410-419. doi:10.1002/PMRJ.12244

10. Jahre H, Grotle M, Småstuen M, et al. Risk factors and risk profiles for neck pain in young adults: Prospective analyses from adolescence to young adulthood-The North-Trøndelag Health Study. *PLoS One*. 2021;16(8). doi:10.1371/JOURNAL.PONE.0256006

11. Edwards RR, Dworkin RH, Sullivan MD, Turk DC, Wasan AD. The Role of Psychosocial Processes in the Development and Maintenance of Chronic Pain. *J Pain*. 2016;17(9 Suppl):T70-T92. doi:10.1016/J.JPAIN.2016.01.001

12. Kim R, Wiest C, Clark K, Cook C, Horn M. Identifying risk factors for first-episode neck pain: A systematic review. *Musculoskelet Sci Pract*. 2018;33:77-83. doi:10.1016/J.MSKSP.2017.11.007

13. Damasceno GM, Ferreira AS, Nogueira LAC, Reis FJJ, Andrade ICS, Meziat-Filho N. Text neck and neck pain in 18-21-year-old young adults. *Eur Spine J*. 2018;27(6):1249-1254. doi:10.1007/S00586-017-5444-5

14. Correia IMT, Ferreira ADS, Fernandez J, Reis FJJ, Nogueira LAC, Meziat-Filho N. Association Between Text Neck and Neck Pain in Adults. *Spine (Phila Pa 1976)*. 2021;46(9):571-578. doi:10.1097/BRS.0000000000003854

15. Bertozzi L, Negrini S, Agosto D, et al. Posture and time spent using a smartphone are not correlated with neck pain and disability in young adults: A cross-sectional study. *J Bodyw Mov Ther*. 2021;26:220-226. doi:10.1016/J.JBMT.2020.09.006

16. Gustafsson E, Thomée S, Grimby-Ekman A, Hagberg M. Texting on mobile phones and musculoskeletal disorders in young adults: A five-year cohort study. *Appl Ergon*. 2017;58:208-214. doi:10.1016/J.APERGO.2016.06.012

17. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *J Clin Epidemiol*. 2008;61(4):344-349. doi:10.1016/J.JCLINEPI.2007.11.008

18. Matsudo S, Araújo T, Matsudo V, et al. Questionário Internacional de Atividade Física (IPAQ): Estudo de validade e reprodutibilidade no Brasil. *Revista Brasileira de Atividade Física & Saúde*. 2001;6(2):5-18. doi:10.12820/RBAFS.V.6N2P5-18

19. Mescollotto FF, Castro EM de, Pelai EB, Pertille A, Bigaton DR. Translation of the short version of the Smartphone Addiction Scale into Brazilian Portuguese: cross-cultural adaptation and testing of measurement properties. *Braz J Phys Ther*. 2019;23(3):250-256. doi:10.1016/J.BJPT.2018.08.013

20. Kent P, Mirkhil S, Keating J, Buchbinder R, Manniche C, Albert HB. The concurrent validity of brief screening questions for anxiety, depression, social isolation, catastrophization, and fear of movement in people with low back pain. *Clin J Pain*. 2014;30(6):479-489. doi:10.1097/AJP.0000000000000010

21. Capuano-Pucci D, Rheault W, Aukai J, Bracke M, Day R, Pastrick M. Intratester and intertester reliability of the Cervical Range of Motion device. *Arch Phys Med Rehabil*. 1991;72(5):338-340. doi:10.5555/URI:PII:000399939190254G

22. Tousignant M, Smeesters C, Breton AM, Breton É, Corriveau H. Criterion validity study of the cervical range of motion (CROM) device for rotational range of motion on healthy adults. *J Orthop Sports Phys Ther*. 2006;36(4):242-248. doi:10.2519/JOSPT.2006.36.4.242

23. Richards K V., Beales DJ, Smith AL, O'sullivan PB, Straker LM. Is Neck Posture Subgroup in Late Adolescence a Risk Factor for Persistent Neck Pain in Young Adults? A Prospective Study. *Phys Ther*. 2021;101(3). doi:10.1093/PTJ/PZAB007

24. Elliott JM, Walton DM, Albin SR, et al. Biopsychosocial sequelae and recovery trajectories from whiplash injury following a motor vehicle collision. *Spine J*. 2023;23(7):1028-1036. doi:10.1016/J.SPINEE.2023.03.005

25. O'Neill A, O'Sullivan K, O'Keeffe M, Hannigan A, Walsh C, Purtill H. Development of pain in older adults: a latent class analysis of biopsychosocial risk factors. *Pain*. 2018;159(8):1631-1640. doi:10.1097/J.PAIN.0000000000001251

26. Moseley GL, Butler DS. Fifteen Years of Explaining Pain: The Past, Present, and Future. *J Pain*. 2015;16(9):807-813. doi:10.1016/J.JPAIN.2015.05.005

27. Nijs J, Loggia ML, Polli A, et al. Sleep disturbances and severe stress as glial activators: key targets for treating central sensitization in chronic pain patients? *Expert Opin Ther Targets*. 2017;21(8):817-826. doi:10.1080/14728222.2017.1353603

28. Haack M, Simpson N, Sethna N, Kaur S, Mullington J. Sleep deficiency and chronic pain: potential underlying mechanisms and clinical implications. *Neuropsychopharmacology*. 2020;45(1):205-216. doi:10.1038/S41386-019-0439-Z

29. Alsaadi SM, McAuley JH, Hush JM, et al. The bidirectional relationship between pain intensity and sleep disturbance/quality in patients with low back pain. *Clin J Pain*. 2014;30(9):755-765. doi:10.1097/AJP.0000000000000055

30. Smith D, Wilkie R, Croft P, Parmar S, McBeth J. Pain and mortality: mechanisms for a relationship. *Pain*. 2018;159(6):1112-1118. doi:10.1097/J.PAIN.0000000000001193

31. Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *Cochrane Database Syst Rev*. 2017;4(4). doi:10.1002/14651858.CD011279.PUB3

32. Sluka KA, Frey-Law L, Bement MH. Exercise-induced pain and analgesia? Underlying mechanisms and clinical translation. *Pain*. 2018;159 Suppl 1(Suppl 1):S91-S97. doi:10.1097/J.PAIN.0000000000001235

33. Belavy DL, Van Oosterwijck J, Clarkson M, et al. Pain sensitivity is reduced by exercise training: Evidence from a systematic review and meta-analysis. *Neurosci Biobehav Rev*. 2021;120:100-108. doi:10.1016/J.NEUBIOREV.2020.11.012

34. Hayden JA, Ellis J, Ogilvie R, et al. Some types of exercise are more effective than others in people with chronic low back pain: a network meta-analysis. *J Physiother*. 2021;67(4):252-262. doi:10.1016/J.JPHYS.2021.09.004

Clique ou toque aqui para inserir o texto.

Table 1. Participant characteristics (n=457).

Age (years), mean (SD)	27.03 (8.54)	Smartphone use time, n (%)	
Sex, n female (%)	319(69.8)	I only use the smartphone to talk	7(1.53)
Body mass (kg), mean (SD)	69.64 (16.4)	Less than one hour a day	12(2.62)
Height (cm), mean (SD)	166.65(9.1)	About 1 hour a day	21(4.59)
Physical activity level, n (%)		About 2 hours a day	55(12.04)
Sedentary	46(10.07)	About 3 hours a day	58(12.69)
Insufficiently active	96(21.01)	About 4 hours a day	67(14.66)
Active	185(40.47)	About 5 hours a day	56(12.25)
Very active	130(28.45)	About 6 hours a day	52(11.38)
Smoking, n smokers (%)	72(15.75)	About 7 hours a day or more	129(28.24)
Visual impairments, n (%)	241(52.74)	Neck flexion angle (CROM) standing (degrees), mean (SD)	34.23(12.15)
Glasses or lens use, n (%)	201(43.98)	Neck flexion angle (CROM) sitted (degrees), mean (SD)	36.28(13.90)
Worry about posture, n (%)		Smartphone dependence (SAS), mean (SD)	31,12(9.98)
Very often	45(9.84)	Anxiety (0-10), mean (SD)	6.46(2.74)
Often	126(27.57)	Social isolation (0-10), mean (SD)	2.46(2.73)
Occasionally	212(46.39)	Depression (0-10), mean (SD)	3.77(3.21)
Rarely	55(12.04)	Stress (0-10), mean (SD)	5.54(3.05)
Never	19(4.16)	Sleep problems, n (%)	
Smartphone adequate posture, n (%)		Nothing	139(30.48)
Very often	9(1.97)	A little	164(35.97)
Often	41(8.97)	Some	113(24.78)
Occasionally	159(34.79)	Seriously	40(8.77)
Rarely	155(33.92)		
Never	93(20.35)	Neck pain (today) after 1 year, n (%)	40(10.01)
Worry about smartphone posture, n (%)		Neck pain frequency after 1 year, n (%)	396(86.84)
Very often	13(2.85)	Very often	4(1.01)
Often	58(12.72)	Often	20(5.05)
Occasionally	164(35.97)	Occasionally	129(32.58)
Rarely	137(30.04)	Rarely	158(39.89)
Never	84(18.42)	Never	85(21.47)

Table 2. Odds ratio (OR) for the association between text neck while standing - assessed by cervical flexion angle - with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)		
	OR adjusted	95% CI	*p*-value
Cervical flexion angle (CROM*), standing	1.01	0.97–1.04	0.712
Age	1.02	0.97–1.06	0.457
Sex (male)	1.20	0.52–2.77	0.669
Smartphone use time	1.21	0.98–1.49	0.077
Smartphone dependence	1.00	0.96–1.04	0.921
Anxiety	1.09	0.92–1.29	0.301
Depression	0.98	0.87–1.12	0.820
Physical activity - Sedentary	2.39	0.83–6.86	0.106
Physical activity - Insufficiently active	2.46	1.05–5.75	0.038
Physical activity - Very active	0.51	0.17–1.52	0.229
Sleep quality	1.77	1.18–2.64	0.005
	Frequency of neck pain (model 2)		
	OR adjusted	95% CI	*p*-value
Cervical flexion angle (CROM*), standing	1.01	0.99–1.03	0.352
Age	1.02	0.99–1.04	0.218
Sex (male)	1.01	0.52–1.96	0.975
Smartphone use time	1.06	0.94–1.19	0.344
Smartphone dependence	1.00	0.97–1.03	0.974
Anxiety	1.05	0.96–1.16	0.267
Depression	0.98	0.91–1.06	0.628
Physical activity - Sedentary	1.56	0.73–3.31	0.246
Physical activity - Insufficiently active	1.18	0.67–2.07	0.567
Physical activity - Very active	1.00	0.59–1.69	0.994
Sleep quality	1.55	1.21–2.00	0.001

*Cervical range of motion instrument

Table 3. Odds ratio (OR) for the association between text neck while sitting - assessed by cervical flexion angle – with prevalence of neck pain (model 1) and frequency of neck pain (model 2) considering potential confounders for each model.

	Prevalence of neck pain (model 1)		
	Adjusted OR	95% CI	*p*-value
Cervical flexion angle (CROM*), sitting	1.01	0.98–1.04	0.478
Age	1.02	0.97–1.06	0.434
Sex (male)	1.20	0.52–2.74	0.665
Smartphone use time	1.21	0.98–1.50	0.076
Smartphone dependence	1.00	0.95–1.04	0.872
Anxiety	1.09	0.93–1.29	0.288
Depression	0.98	0.87–1.12	0.808
Physical activity - Sedentary	2.36	0.83–6.75	0.108
Physical activity - Insufficiently active	2.41	1.03–5.65	0.042
Physical activity - Very active	0.51	0.17–1.51	0.225
Sleep quality	1.76	1.17–2.63	0.006
	Frequency of neck pain (model 2)		
	Adjusted OR	95% CI	*p*-value
Cervical flexion angle (CROM*), sitting	1.00	0.99–1.02	0.591
Age	1.02	0.99–1.04	0.221
Sex (masculine)	1.02	0.53–1.99	0.941
Smartphone use time	1.06	0.94–1.19	0.327
Smartphone dependence	1.00	0.97–1.03	1.000
Anxiety	1.06	0.96–1.16	0.248
Depression	0.98	0.90–1.06	0.614
Physical activity - Sedentary	1.53	0.72–3.25	0.266
Physical activity - Insufficiently active	1.18	0.67–2.07	0.566
Physical activity - Very active	0.99	0.58–1.68	0.974
Sleep quality	1.55	1.21–1.99	0.001

*Cervical range of motion instrument

UNISUAM

COMPROMISSO PARA A VIDA TODA