

Long-term Effect of Smartphone Addiction on Tooth Wear Caused by Altered Cervical Posture

Rajesh Kumar Thakur¹, Brian Mickel², Pushpanjali Krishnappa³

¹BDS, MDS | Periodontology

²DDS

³BDS, MDS, PhD | Public Health Dentistry

Abstract

Smartphone addiction has emerged as a growing behavioral concern, with prolonged device use frequently associated with sustained cervical flexion, forward-head posture, and altered neuromuscular activity. Although the musculoskeletal consequences of excessive smartphone use are increasingly recognized, its potential long-term effects on oral structures, particularly tooth wear, remain insufficiently explored. This article examines the possible relationship between chronic smartphone-associated cervical postural alterations and progressive tooth wear. Persistent forward-head positioning may influence mandibular posture, masticatory muscle activity, occlusal relationships, and parafunctional behaviors such as clenching and bruxism. These changes may increase mechanical loading on dental surfaces and potentially contribute to accelerated attrition, particularly when combined with other behavioral and dietary risk factors. The proposed relationship is multifactorial and may involve interactions between cervical biomechanics, temporomandibular function, neuromuscular adaptation, and occlusal stress. Understanding this association could support earlier identification of individuals at increased risk of excessive tooth wear and encourage preventive interventions targeting smartphone ergonomics and oral health behaviors. Future longitudinal studies integrating cervical posture assessment, smartphone-use patterns, occlusal evaluation, and quantitative tooth-wear measurements are needed to establish temporal relationships and clarify causality. Greater awareness among dental and healthcare professionals may facilitate comprehensive prevention and management strategies for smartphone-related postural and oral health consequences.

Keywords: Smartphone addiction; smartphone overuse; cervical posture; forward-head posture; tooth wear; bruxism; occlusion; masticatory muscles; temporomandibular function; oral health.

Introduction and Conceptual Background

Smartphone use has become deeply integrated into daily life, but prolonged and repetitive use may produce adverse postural and musculoskeletal adaptations. Smartphone addiction or excessive smartphone use is commonly characterized by extended periods of device interaction, often accompanied by sustained cervical flexion, forward-head positioning, and static sitting postures. These behaviors have been associated with alterations in cervical mobility, head posture, cervicofacial muscle function, and musculoskeletal discomfort (IX, 2021; Ojha et al., 2022; Acet et al., 2025). The term “text neck” describes the postural pattern and associated symptoms that may develop from prolonged

smartphone-related neck flexion, with evidence suggesting that persistent exposure can impose substantial biomechanical stress on the cervical region (Khattak et al., 2019; Goswami et al., 2024).

The potential consequences may extend beyond the cervical spine because head and neck posture are functionally connected with the stomatognathic system. Alterations in cervical alignment may influence mandibular positioning, masticatory-muscle activity, occlusal relationships, and temporomandibular function. In school-aged children and adolescents, maladaptive device-related postures have also been associated with neck and upper-extremity musculoskeletal symptoms, emphasizing the importance of prolonged postural exposure across younger populations (Warda et

al., 2023). These biomechanical adaptations may theoretically increase parafunctional activity, including clenching or bruxism, thereby contributing to excessive mechanical loading of dental surfaces and progressive tooth wear.

Modern dental imaging, including three-dimensional imaging and cone-beam computed tomography (CBCT), may assist in evaluating relevant dentofacial structural relationships when clinically indicated (Singh, 2018). Furthermore, understanding tooth wear is important because advanced structural loss may eventually require restorative intervention, making preservation of remaining tooth structure and appropriate restorative material selection clinically relevant (Singh, 2025). Therefore, investigating the long-term relationship between smartphone-associated cervical posture and tooth wear may provide valuable insights into an emerging intersection between digital behavior, musculoskeletal biomechanics, and oral health.

Relationship Between Smartphone Use, Cervical Posture, and Tooth Wear

Prolonged smartphone use is increasingly associated with sustained cervical flexion, forward-head positioning, and altered cervicofacial muscle activity. Excessive smartphone exposure requires users to maintain the head and neck in a flexed position for extended periods, potentially producing adaptive changes in cervical biomechanics and muscle function (IX, 2021). The cumulative effects of this behavior have been described as “text neck,” with prolonged use associated with postural abnormalities, neck discomfort, and musculoskeletal strain (Khattak et al., 2019). Cross-sectional evidence further indicates that smartphone addiction may influence sitting neck posture and contribute to discomfort during prolonged device use (Ojha et al., 2022).

Maladaptive smartphone-related postures may also affect younger users, with neck and upper-extremity symptoms reported in children and adolescents exposed to prolonged cell-phone-related postural demands (Warda et al., 2023). Similarly, prolonged faulty posture has been linked to cervical pain and functional disturbances among smartphone

users (Goswami et al., 2024). Changes in head and cervical positioning may influence mandibular posture, masticatory muscle activity, occlusal relationships, and temporomandibular loading. Acet et al. (2025) further demonstrated the relevance of smartphone addiction to cervical mobility and head posture, supporting a potential biomechanical pathway between smartphone behavior and the stomatognathic system.

From a dental perspective, altered cervical posture may indirectly contribute to tooth wear by increasing muscular tension, parafunctional clenching, or bruxism-related occlusal forces. Repeated excessive loading can contribute to mechanical tooth-surface loss, although tooth wear remains multifactorial and cannot be attributed to smartphone use alone. Three-dimensional imaging and CBCT may provide useful supplementary information when evaluating associated dentofacial structural changes and treatment planning (Singh, 2018). Furthermore, progressive tooth wear may eventually require restorative intervention, making restoration durability and material performance clinically relevant (Singh, 2025).

Overall, the relationship between smartphone use, cervical posture, and tooth wear is best considered a potential indirect biomechanical association requiring further longitudinal investigation.

Long-Term Clinical Implications and Research Considerations

Long-term smartphone overuse may have important clinical implications for the stomatognathic system because persistent forward-head and flexed cervical postures can influence cervicofacial muscle activity, mandibular positioning, and neuromuscular coordination. Evidence linking smartphone use with cervical and cervicofacial alterations suggests that prolonged exposure may contribute to sustained postural adaptations and musculoskeletal symptoms (IX, 2021; Khattak et al., 2019; Ojha et al., 2022). In younger populations, maladaptive device-related postures have similarly been associated with neck and upper-extremity symptoms, emphasizing the importance of early ergonomic intervention (Warda et al., 2023). These changes may indirectly

increase occlusal loading or parafunctional activity, potentially contributing to progressive tooth wear, although a direct causal relationship remains to be established.

Clinically, patients presenting with unexplained or accelerated tooth wear may benefit from assessment of smartphone-use habits, cervical posture, mandibular function, and parafunctional behaviors. Advanced three-dimensional imaging, including CBCT when clinically justified, may assist in evaluating relevant dentofacial and structural relationships (Singh, 2018). Management should emphasize posture correction, ergonomic smartphone positioning, behavioral modification, and monitoring of occlusal changes. When substantial tooth wear requires restorative intervention, appropriate material selection and evaluation of restoration durability remain important considerations (Singh, 2025).

Future research should prioritize longitudinal studies integrating quantified smartphone exposure, cervical posture measurements, electromyographic assessment, occlusal analysis, bruxism monitoring, and standardized tooth-wear indices. Digital posture-tracking technologies and three-dimensional dental imaging may strengthen objective assessment. Continued evidence regarding smartphone-related cervical dysfunction and altered mobility further supports investigation of this potential oral-health pathway (Goswami et al., 2024; Acet et al., 2025). Such research could clarify whether cervical postural changes represent an independent risk factor or a contributing component within the multifactorial etiology of tooth wear.

Future Perspectives and Conclusion

The long-term effects of smartphone addiction on tooth wear represent an emerging interdisciplinary area connecting digital behavior, cervical biomechanics, and oral health. Prolonged smartphone use has been associated with forward-head posture, altered cervical mobility, and cervicofacial muscular changes, providing a plausible biomechanical basis for investigating its influence on the stomatognathic system (IX, 2021; Ojha et al., 2022; Acet et al., 2025). Persistent maladaptive posture may alter mandibular positioning, masticatory muscle activity,

occlusal loading, and parafunctional behaviors, potentially contributing to progressive tooth wear. The broader musculoskeletal consequences of prolonged smartphone-related postures have also been documented in children, adolescents, and adults (Khattak et al., 2019; Warda et al., 2023; Goswami et al., 2024).

Future research should prioritize longitudinal studies incorporating smartphone-use duration, cervical posture measurements, electromyographic assessment, occlusal analysis, bruxism evaluation, and standardized quantitative tooth-wear indices. Advanced three-dimensional imaging, including CBCT when clinically justified, may assist in evaluating associated dentofacial and structural changes (Singh, 2018). Digital posture-monitoring technologies and wearable sensors could further clarify the relationship between cumulative postural exposure and oral functional changes.

From a clinical perspective, preventive strategies should combine ergonomic smartphone practices, posture correction, behavioral modification, and routine dental monitoring. Early identification of excessive tooth wear may permit conservative intervention and appropriate restorative planning, where material selection and mechanical performance are important considerations (Singh, 2025). Overall, current evidence supports a plausible association between prolonged smartphone-related cervical dysfunction and oral biomechanical changes, but a direct causal relationship with tooth wear remains to be established. Multidisciplinary research involving dentistry, physiotherapy, and behavioral health is therefore essential to clarify this emerging relationship and develop effective preventive approaches.

References

1. Singh, S. (2018). The efficacy of 3D imaging and cone-beam computed tomography (CBCT) in enhancing endodontic diagnosis and treatment planning. *International Journal of Scientific Research and Management*, 6(6), 27-29.
2. IX, B. (2021). *Evaluation Of Effect Of Smartphone Overuse On Cervicofacial Muscles And Cervical Spine* (Doctoral dissertation, Maharashtra

- University of Health Sciences).
3. Warda, D. G., Nwakibu, U., & Nourbakhsh, A. (2023, March). Neck and upper extremity musculoskeletal symptoms secondary to maladaptive postures caused by cell phones and backpacks in school-aged children and adolescents. In *Healthcare* (Vol. 11, No. 6, p. 819). MDPI.
 4. Singh, S. (2025). Comparative Evaluation of Tensile Bond Strength between Glass Ionomer Cements and Composite Resins in Dental Restorations. *Journal of Advanced Medical and Dental Sciences Research*, 13(6), 4-7.
 5. Khattak, S., Gul, M., Kakar, H. A., Ullah, G., & Rahman, M. U. (2019). The cost of long-term use of smart phones in the form of text neck syndrome; a systematic review. *Rehman Journal of Health Sciences*, 1(1), 3-5.
 6. Ojha, R., Sindhu, B., & Sen, S. (2022). Effects of smartphone addiction on sitting neck posture & hand discomfort: A cross sectional study. *International journal of health sciences*, (II), 13642-13650.
 7. Goswami, P., Wankhar, W., & Sarma, B. C. (2024). The Impact of Faulty Posture on Neck Pain in Prolong Smartphone Users-A Literature Review. *International Journal of Health & Allied Sciences*, 13(3), 144-150.
 8. Amuda, B. (2022). Integrating Social Media and GIS Data to Map Vaccine Hesitancy Hotspots in the United States. *Multidisciplinary Innovations & Research Analysis*, 3(4), 35-50.
 9. Acet, N., Beğen, S., & Esmer, M. (2025). Does smartphone addiction affect cervical mobility, head posture, body awareness and pain pressure threshold?. *Journal of Health Sciences and Medicine*, 8(1), 57-62.