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Types of hypercementosis based on panoramic radiographic observation

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Abstract

Background and aim: Hypercementosis is a dental anatomical anomaly marked by excessive non-neoplastic cementum deposition, which can be effectively identified using panoramic radiography. Its morphological variants—diffuse, focal, and shirt sleeve cuff—carry notable clinical relevance, particularly in orthodontic, endodontic, and oral surgery procedures. Purpose: This study aims to review and synthesise the types of hypercementosis documented through panoramic radiographic assessments. Methods: A literature search was conducted using Google Scholar, PubMed, and Scopus with the keywords hypercementosis, diffuse, focal, localized, shirt sleeve cuff, and panoramic. Eligible articles included full-text, open-access, Scopus-indexed studies (Q1–Q4) employing panoramic radiographs and original study designs. Excluded materials consisted of animal studies, review papers, case reports lacking type classification, and studies not utilizing panoramic imaging. Seven studies met the criteria and were analysed according to study design, diagnostic methods, and reported hypercementosis types. Result: The diffuse variant emerged as the most commonly reported form across population-based studies and case reports. In contrast, focal and shirt sleeve cuff types were less frequently observed but displayed distinct radiographic characteristics. Panoramic radiography proved to be a reliable modality for recognizing cementum thickening patterns, root morphology alterations, and potential local etiological contributors such as eruption disturbances, impactions, or occlusal trauma. Conclusion: Diffuse hypercementosis is the most prevalent morphological type reported in panoramic assessments. Panoramic radiography plays a crucial initial diagnostic role in identifying and classifying hypercementosis to guide appropriate clinical management.

Keyword: Hypercementosis; Diffuse; Focal; Shirt Sleeve Cuff; Panoramic

1. Introduction

Hypercementosis refers to an anatomical alteration characterized by excessive deposition of non-neoplastic cementum on one or multiple tooth roots [1,2]. This condition may arise due to supraeruption, inflammatory processes, or occlusal trauma, and it is also associated with systemic disorders such as Paget's disease, hypopituitarism, gigantism, and acromegaly [3–5]. Reported prevalence varies globally, with rates of 10.8% in Turkey, 16.3% in Mexico, 4.82% in Saudi Arabia, and 1.3% in Germany [6–9]. Radiographically, hypercementosis appears as periapical radiopacity with cementum thickening—primarily affecting the apical third—while the periodontal ligament space remains intact [5].

Panoramic radiography is considered an efficient tool for detecting hypercementosis because it visualizes the entire dentition and is advantageous for identifying multiple affected teeth simultaneously [10,11]. Based on radiographic appearance, hypercementosis is classified into three types: diffuse, focal, and shirt sleeve cuff [7], with the diffuse type being the most frequently reported [6,7]. Although often asymptomatic, recognizing hypercementosis is essential due to its potential to complicate procedures such as tooth extraction and endodontic treatment [12–14].

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Hypercementosis also poses challenges in orthodontic and endodontic management. Diffuse hypercementosis may hinder orthodontic movement due to bulbous root morphology and an increased risk of concrescence [15]. In contrast, focal and shirt sleeve cuff types generally allow tooth movement but still require careful consideration. Endodontic complications may also arise, including multiple foramina, accessory canals, or apical obliteration in the diffuse type [16–18]. Consequently, identifying the specific hypercementosis type is vital for proper treatment planning and preventing avoidable complications.

1.1. Reseacrh purpose

This review compiles findings from cross-sectional studies, case reports, and relevant literature involving panoramic radiographic evaluation of hypercementosis.

2. Methods

The literature search was carried out through Google Scholar, PubMed, and Scopus using the keywords *hypercementosis*, *diffuse*, *focal*, *localized*, *shirt sleeve cuff*, and *panoramic/OPG*. Only studies containing these keywords were included for further evaluation. The inclusion criteria consisted of literature that provided panoramic or orthopantomogram (OPG) radiographs, was available in full-text and open-access format, utilized an original research design, was published between 2010 and 2025, and was indexed in Scopus (Q1–Q4). Studies were excluded if they used imaging modalities other than panoramic radiography, were not available in full-text or were closed-access, involved animal experimentation, or were review articles or case reports that did not specifically assess the types of hypercementosis based on panoramic radiographic observations.

3. Search results

Seven studies met all inclusion criteria and were included in the review. These studies were selected based on methodological relevance and their focus on identifying hypercementosis types. Each publication was evaluated based on study design, sample profile, assessment methods, and findings related to hypercementosis classification. A summarised overview is provided in Table 1.

Table 1 Search Results from Articles and Journals Based on Inclusion and Exclusion Criteria

Author	Title	Study Design	Article Results Related to Hypercementosis Type
Hichijo, Kudo, & Tanaka (2020)	Orthodontic treatment of open bite involved in diffuse hypercementosis	Case Report	Reported diffuse hypercementosis observed on all teeth (except anterior teeth) on panoramic radiographs, and suggested that failure of eruption of the upper left second molar was caused by hypercementosis.
Defne *et al.* (2021)	Prevalence of Hypercementosis and Frequency of Possible Etiological Factors in a Turkish Subpopulation	Retrospective Cross-Sectional Study	Reported the prevalence and types of hypercementosis, showing that the diffuse type was the most frequently found, while the cuff type was the least common.
Ruiz & Chincaro (2023)	Patterns of Hypercementosis and Their Relationship With Possible Local Etiological Factors in Radiographs of Individuals From a Mexican Population	Retrospective Cross-Sectional Study	Found that the diffuse form occurred most frequently (75.28%), followed by the focal pattern (19.54%), with the sleeve-shaped morphology being the rarest.
Jeddy *et al.* (2014)	Localized Multiple Cemental Excrescences: A Rare Presentation of Hypercementosis	Case Report	Pre-operative panoramic radiographs showed erupted teeth 18 and 28, as well as impacted teeth 38 and 48. Digital intraoral radiographs revealed localized/focal type hypercementosis.

Nagaveni & Umashankar (2024)	Localized Idiopathic Cemental Hyperplasia involving all four third molars: Report of a Rare Case	Case Report	The hypercementosis in this case was classified as circular cemental hyperplasia, corresponding to the shirt sleeve cuff type.
Consolaro & Kandalaft (2025)	Hypercementosis: can teeth be moved or not?	Narrative Review	Explained that teeth with diffuse hypercementosis cannot be moved effectively in orthodontics, while focal and shirt sleeve cuff types may still allow movement based on their morphology.
Asykarie, Ramadhan, & Firman (2022)	Multiple hypercementosis—a case report of an incidental finding on panoramic radiograph	Case Report	Panoramic radiographs showed cementum thickening at the apices of the remaining teeth, and the case was classified as diffuse type hypercementosis.

4. Discussion

Hypercementosis is characterized by excessive cementum deposition detected predominantly through radiographic interpretation, especially panoramic imaging. Although often asymptomatic and frequently discovered incidentally, it may impact clinical outcomes such as eruption patterns, orthodontic biomechanics, and endodontic management. From the literature spanning 2010–2025, a comprehensive representation of the different hypercementosis types can be observed.

Hichijo, Kudo, and Tanaka [12] reported a case involving a patient with a total open bite whose occlusal function was limited to selected molars. Panoramic imaging revealed widespread diffuse hypercementosis affecting nearly all posterior teeth, with anterior teeth remaining unaffected. Failure of eruption of the upper left second molar was attributed to hypercementosis, resulting in increased resistance to orthodontic movement, particularly extrusion. Although intrusion was possible, extrusion remained challenging, and the tooth was at risk of infraocclusion. Despite these difficulties, the final occlusion was successfully restored, demonstrating that hypercementosis can influence tooth eruption and orthodontic biomechanics [15].

Large-scale studies conducted by Defne et al. [6] and Ruiz & Chincaro [7] further highlight the predominance of the diffuse form. Both studies reported diffuse hypercementosis as the most common variant, while the shirt sleeve cuff type was the rarest. Similar patterns observed across different populations imply that diffuse hypercementosis may be globally predominant regardless of demographic variations. Their findings also reinforce the value of panoramic radiography for early detection.

Focal hypercementosis presents unique radiographic traits that must be recognised to avoid diagnostic errors. Jeddy et al. [19] described cemental excrescences appearing as sharp projections continuous with tooth roots—findings that may mimic periapical pathology or root resorption if misinterpreted. The shirt sleeve cuff type, although uncommon, presents as cementum thickening encircling the root surface. A case described by Nagaveni and Umashankar [21] demonstrated this characteristic morphology and its implications for surgical extraction, as altered root contours may complicate the procedure.

Consolaro and Kandalaft [15] emphasized that tooth movement in cases of diffuse hypercementosis is mechanically challenged due to root thickening and irregular cementum deposition. The increased root-to-bone contact heightens biomechanical resistance, whereas focal and shirt sleeve cuff types remain more permissive to movement. A case by Asykarie et al. [20] highlighted the prosthodontic implications of hypercementosis, which altered root shape increases extraction difficulty and risks such as root fracture or bone trauma prior to prosthetic rehabilitation.

Overall, hypercementosis displays a wide spectrum of radiographic presentations. Diffuse type remains the most frequently encountered, while focal and shirt sleeve cuff types appear less often but have distinct features influencing diagnosis and treatment decisions [6, 7].

Panoramic radiography plays a central role in visualising root morphology, cementum deposition patterns, and local contributing factors such as impaction or occlusal trauma. Supplementary intraoral radiographs can further improve diagnostic precision [10,11,19].

From a clinical perspective, the findings in this literature highlight the importance of identifying the type of hypercementosis before determining a treatment plan, whether for orthodontic, prosthodontic, or oral surgery procedures. The diffuse type, for example, may affect tooth movement and lead to eruption failure. Although rare, the shirt sleeve cuff and focal types still carry clinical implications, particularly in tooth extraction procedures or radiographic interpretation. [12, 19, 20, 21].

5. Conclusion

This literature review indicates that diffuse hypercementosis is the most commonly identified type in panoramic radiographic examinations. Given its diagnostic advantages, panoramic radiography serves as an essential first-line imaging modality for identifying and classifying hypercementosis and for supporting accurate planning in orthodontic, endodontic, and surgical treatments.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

Statement of Informed consent

Informed consent was obtained from all individual participants included in this study.

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