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Ethnic and racial considerations in dental tooth extraction: a scoping review of current findings

Netra Jayant Shah[1], Dhananjay Gandage[1], V. N. V. Madhav[1], Amit Jagtap[1], Saurabh Suresh Jain[2]

[1]*Department of Prosthodontics, Crown and Bridge, Esthetics and Oral Implantology, Dr. D. Y. Patil Dental College and Hospital, Dr. D. Y. Patil Vidyapeeth,* [2]*Department of Head and Neck Oncology, Indrayani Hospital and Cancer Institute, Pune, India*

Abstract (J Korean Assoc Oral Maxillofac Surg 2026;52:139-149)

Dental extractions are among the most frequently performed procedures in dentistry. While anatomical, behavioral, and access-related factors are known to influence extraction outcomes, the role of racial and ethnic characteristics in shaping extraction techniques, preferences, and disparities has not been synthesized. This scoping review aimed to explore and map the existing evidence on how racial, ethnic factors influence dental tooth extraction. A search was conducted across PubMed, Scopus, Google Scholar using a combination of MeSH terms and keywords related to dental extraction, race, ethnicity, anatomy, and sociocultural behavior. The review followed PRISMA-ScR guidelines. A total of 15 studies were included, encompassing anthropological, clinical, forensic, public health perspectives. The review identified key racial anatomical traits (e.g., root morphology, dental arch form, bone density) that affect extraction difficulty, particularly among Caucasoid, Mongoloid, and Negroid populations. Ethnic and cultural factors—health beliefs, care-seeking behavior, and access disparities—played a role in extraction timing and technique. Provider bias, lack of diversity within the dental workforce emerged as contributing factors to inequitable care delivery. Integrating this understanding into dental education, clinical guidelines can support equitable, culturally competent care. Further research is warranted to bridge anatomical evidence with behavioral and structural determinants of extraction disparities.

Key words: Tooth extractions, Ethnicity and health, Anatomic variation, Healthcare disparities, Oral health

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I. Introduction

Tooth extraction is the third most performed dental procedure across the world, essential in the management of a plethora of dental conditions. It is typically indicated in cases of chronic periodontal disease, non-restorable carious lesions, failed endodontic treatments, root fractures, periapical abscesses, root stumps, and to facilitate orthodontic or prosthodontic rehabilitation[1,2]. Despite being categorized as routine, tooth extraction is not a trivial intervention. Clinical consequences such as alveolar bone loss, delayed wound healing, postoperative infection, paresthesia, and persistent pain are well-documented sequelae[3]. These complications are often multifactorial, influenced by patient-specific systemic conditions, anatomical variation, and practitioner technique[4].

While anatomical and systemic factors are frequently studied in relation to extraction outcomes, there is growing awareness that a patient's racial and ethnic background may significantly impact the decision-making process, procedural complexity, and postoperative experience of dental extractions[5]. Racial and ethnic populations differ not only in terms of anatomical, dental and craniofacial traits, but also in their sociocultural beliefs, patterns of health service use, and access to care. These differences are often under-recognized in mainstream clinical literature and dental curricula[6].

From a biological standpoint, research in dental anthropology and forensic odontology has demonstrated significant racial variation in dental structures. For example, the Caucasoid population is characterized by narrow, triangular palates and "V"-shaped dental arches, contributing to increased crowding and requiring careful consideration during orthodontic extraction planning. Their molars often have splayed and

Netra Jayant Shah
Department of Prosthodontics, Crown and Bridge, and Oral Implantology, Dr. D. Y. Patil Dental College and Hospital, Dr. D. Y. Patil Vidyapeeth, Sant Tukaram Nagar, Pimpri, Pune 411018, India
TEL: +91-9922399556
E-mail: netrashah2000@gmail.com
ORCID: https://orcid.org/0009-0003-3433-5423

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bent roots, increasing the risk of root fracture during extractions[7-9]. Mongoloid populations, such as East Asians and Native Americans, often exhibit a parabolic arch, shovel-shaped incisors, and the presence of an extra distal root (radix entomolaris) in mandibular molars, making surgical access more complex and requiring advanced imaging and planning[10]. In contrast, Negroid populations typically exhibit a wider, rectangular palate, a more hyperbolic arch form, marked alveolar prognathism, and shorter, more fused molar roots, which may alter the angulation and technique of luxation during surgical extractions[11]. These anatomical and physiological differences may have implications for extraction planning; however, the included evidence is largely descriptive, and direct clinical validation of technique-specific effects remains limited[12].

Beyond racial anatomical traits, ethnic identity incorporates a broader set of factors—cultural values, health-seeking behaviors, language, immigration history, and systemic exposure to inequality—all of which influence oral health outcomes and the likelihood of tooth extraction. According to the Centers for Disease Control and Prevention, dental caries and untreated decay remain the most prevalent chronic condition among children, with Black and Hispanic children exhibiting the highest prevalence[2,13,14]. Dental care remains one of the greatest unmet health needs in these populations, often due to a combination of socioeconomic hardship, lack of insurance, cultural mistrust, and geographic inaccessibility[15].

Cultural beliefs and attitudes also play a pivotal role in tooth extraction decisions. For example, within certain Latino communities, primary teeth may not be seen as requiring urgent care, and preventive dentistry is sometimes undervalued. In some immigrant or refugee populations, dental pain is self-managed with traditional remedies or ignored until the condition becomes acute—by which time extraction may be the only feasible treatment[16,17]. Language barriers, fear of medical systems, and past trauma with healthcare providers often further delay presentation. Even within broad ethnic categories such as "Latino," beliefs and practices vary significantly—Puerto Rican, Salvadoran, and Mexican populations exhibit different oral health behaviors and levels of trust in the healthcare system[18].

At the same time, provider-related factors, including unconscious bias, cultural misunderstanding, and stereotyping, may influence clinical decisions. Studies have shown that dental practitioners may unconsciously recommend extraction over restorative care based on assumptions about a patient's ability to afford follow-up, maintain oral hygiene, or comply with post-operative instructions. This reinforces a cycle of invasive care and contributes to long-term oral health inequity[6,19-21].

Despite increasing recognition of racial and ethnic disparities in oral health, there remains a lack of integrated understanding of how these factors specifically influence dental extractions. Most studies either focus on anatomical variations or sociocultural influences in isolation, overlooking their combined clinical relevance. This scoping review addresses that gap by synthesizing evidence across disciplines to inform extraction planning, enhance cultural competence, and guide equitable care strategies for diverse populations.

II. Methodology

This scoping review was conducted in accordance with the framework proposed by Arksey and O'Malley, as enhanced by subsequent methodological refinements from Levac et al.[22] and the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis[23]. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist guided the reporting of this review.

The primary objective of this review was to map and synthesize existing literature that explores how racial and ethnic variations influence tooth morphology, craniofacial anatomy, and sociocultural determinants, thereby affecting dental extraction decisions, techniques, and outcomes.

1. Inclusion criteria

- Studies involving human participants from different racial or ethnic backgrounds.
- Studies considering racial and ethnic anatomical differences in tooth, arch, palate, or maxilla; differences in extraction rates, indications, clinical challenges, or access to care.
- Studies conducted in all clinical settings including general dental practice, oral surgery, orthodontics, and public health dentistry.
- Types of evidence included original research (observational, cross-sectional, cohort, forensic, cadaveric, or anatomical studies), systematic reviews, and relevant grey literature.
- Studies published in English language.

2. Exclusion criteria

- Animal studies

- Studies not reporting extraction-related outcomes
- Non-English articles
- Letters, editorials, and conference abstracts without full texts

3. Search strategy

A structured search was conducted in PubMed, Scopus, and Google Scholar from database 1st of January 1990 to 15th of August 2025. The search combined controlled vocabulary and free-text terms related to tooth extraction, dental morphology, race/ethnicity, ancestry, access to care, and sociocultural determinants. After duplicate removal, two reviewers (N.J.S. and S.S.J.) independently screened titles/abstracts and full texts. Data were charted using a standardized form capturing study characteristics, population descriptors, anatomical findings, sociocultural/systemic factors, and extraction-related outcomes. Disagreements were resolved through discussion, with third-reviewer (D.G.) adjudication where needed.

The core search concepts included racial and ethnic differences in dental anatomy, behavior, and care-seeking patterns that may influence tooth extraction. The primary keywords and phrases included:

("racial characteristics" OR "racial traits" OR "racial differences" OR "race-based anatomy" OR "ancestry traits") AND ("ethnic variation" OR "ethnicity" OR "ethnic traits" OR "ethnic differences") AND ("tooth morphology" OR "dental morphology" OR "tooth shape" OR "root configuration" OR "dental arch" OR "palatal shape" OR "maxillary shape") AND ("tooth extraction" OR "dental extraction" OR "exodontia" OR "surgical extraction") AND ("bone density" OR "bone mineral density" OR "mandibular BMD" OR "cortical bone" OR "jaw bone") AND ("sociocultural factors" OR "dental care behavior" OR "oral health disparities" OR "access to dental care" OR "treatment preferences" OR "cultural dental beliefs")

Additional terms were customized per database syntax to improve sensitivity, including:

- "anthropometric dental traits"
- "morphological variation AND extraction complexity"
- "dental arch form AND ethnicity"
- "alveolar prognathism AND racial group"

Beyond database searches, manual hand-searching of the reference lists of included articles was performed to identify any relevant studies that might not have appeared in the initial search, particularly in grey literature sources such as anthropological theses, forensic dental journals, and older anatomical archives. All retrieved records were imported into a reference manager, and duplicates were removed before screening.

4. Study selection

The selection of studies for this scoping review was carried out in two clear stages. First, two reviewers independently screened the titles and abstracts of all articles retrieved during the database search. At this stage, the goal was to filter out studies that were clearly irrelevant—those that didn't deal with racial or ethnic aspects of dentistry, or had nothing to do with tooth extraction.

Once this initial screening was done, full-text versions of the potentially relevant articles were obtained and carefully reviewed. Again, two reviewers assessed each paper to check whether it matched all the inclusion criteria set at the beginning of the review. If there was any disagreement about whether a study should be included, the reviewers discussed it. If they still didn't agree, a third person stepped in to help make the final decision. This approach helped ensure that the selection process was consistent, thorough, and free from individual bias.

5. Data extraction

After finalizing the list of included studies, a structured data extraction process was used to gather key details from each one. This step involved collecting information such as the name of the first author, year of publication, country where the study was conducted, study design, and the specific racial or ethnic groups being studied. The focus was on identifying any dental or craniofacial traits discussed in the study—like tooth shape, root structure, arch form, or bone density and whether these traits had any bearing on tooth extraction.

Alongside anatomical information, the studies were also looked for insights into cultural or behavioral aspects, such as patient attitudes toward dental treatment, access to care, or the role of socioeconomic background. The extraction form was designed to capture both clinical and social dimensions, which together provide a more complete picture of how race and ethnicity can influence tooth extraction.

6. Data synthesis

Once all the information was extracted, it was organized and interpreted. A descriptive synthesis approach was used to bring together common themes and patterns found across the studies. This helped build a broad understanding of how different racial and ethnic factors affect tooth extraction from various angles—clinical, anatomical, and sociocultural.

III. Results

Across populations, notable differences in dental arch shape, root morphology, palate configuration, bone density, and care-seeking behavior were consistently reported. These variations hold important implications for the planning, difficulty, and technique of extractions, particularly in a globally diverse patient population.

The initial comprehensive search retrieved 1,268 articles from databases including PubMed and Google Scholar. After removing duplicates, 658 articles were screened by title and abstract. Of these, 68 full-text articles were assessed for eligibility based on predefined inclusion and exclusion criteria.

Following the two-stage screening process, 15 studies were selected for inclusion in the final synthesis. These studies were assessed by two independent reviewers, and any disagreements regarding eligibility were resolved through discussion or consultation with a third reviewer. The entire study selection process is illustrated in the PRISMA flow diagram. (Fig. 1)

Through thematic analysis, the findings are categorized into key anatomical and behavioral domains, including dental arch and palate morphology, root complexity, mandibular structure, bone mineral density (BMD), and sociocultural influences on treatment timing. A summary of the core characteristics

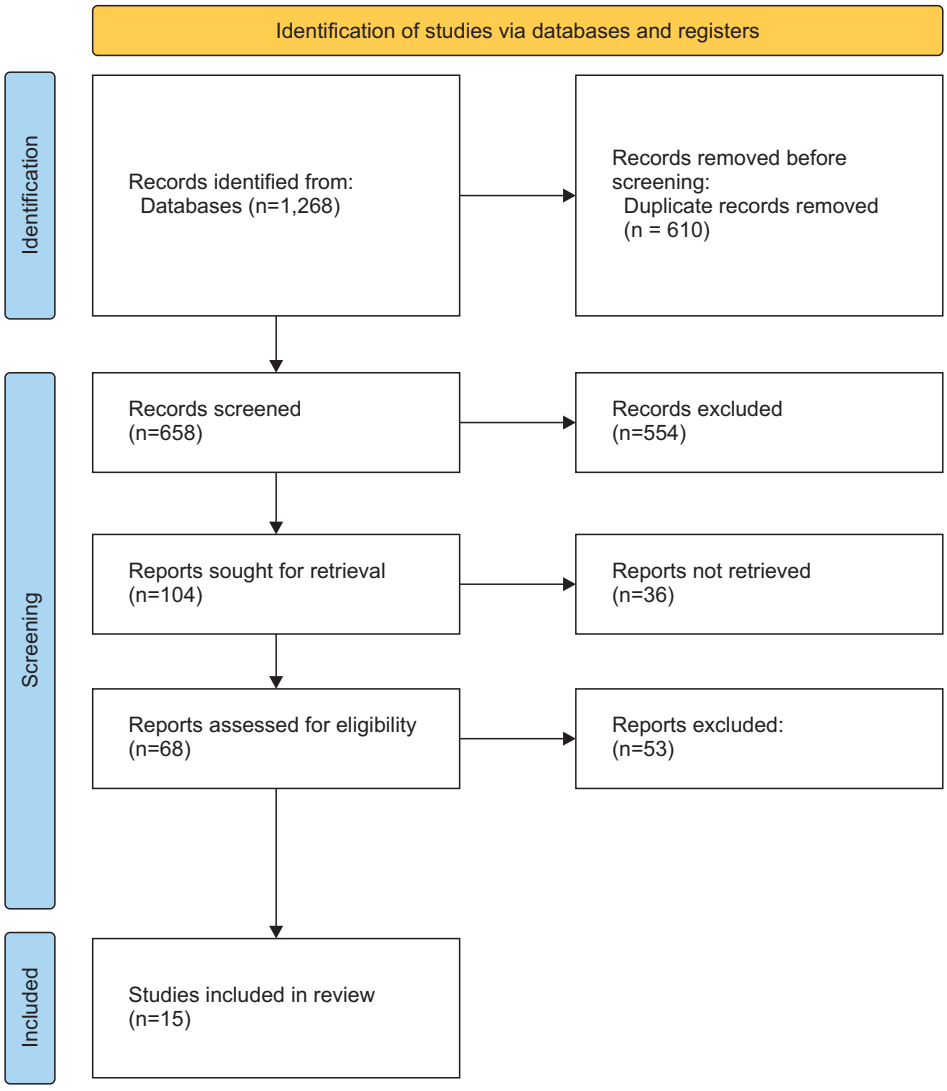


Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.
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of the included literature are tabulated in Table 1[1,5,7-10,12,24-30].

1. Population-level anatomical characteristics relevant to tooth extraction

Variations in craniofacial morphology among different racial and ethnic groups have long been recognized in forensic anthropology, dentistry, and oral surgery. These differences are not merely of academic interest—they carry direct clinical relevance, particularly in procedures like dental extractions, where access, resistance, root morphology, and bone density all play a critical role in planning and execution. The following section synthesizes the anatomical and physiological traits of major racial groups—Caucasoid, Mongoloid, and Negroid—and explores their implications on tooth extraction procedures as also shown in Table 2.

1) Caucasoid characteristics

Caucasoid populations typically exhibit a narrow, V-shaped dental arch with a higher palatal vault. Blumenfeld[24] describe the Caucasoid palate as narrow and triangular, with reduced alveolar prognathism. This anatomical configuration contributes to anterior crowding, often leading to premolar extractions during orthodontic treatment. van Spronsen et al.[25] further highlighted that this narrow palate reduces transverse skeletal width, making space management during surgical access more challenging—especially in posterior regions.

Molars in Caucasoid individuals are more likely to exhibit splayed and bent roots, a feature consistently noted in forensic dental literature Rawlani et al[26]. These anatomical complexities often necessitate the use of sectioning techniques during extraction, particularly in the upper jaw, to avoid root fracture or tuberosity complications. The broader spread of roots in maxillary molars also increases the risk of oroantral communication during extraction.

The mandible in Caucasoid individuals shows a high, narrow ramus with a prominent bilateral chin and larger gonial angle. This affects the angle of instrument insertion during third molar removal and may require modified flap design for adequate visibility. The more protruding chin and robust body also affect bone resistance during luxation and elevation.

2) Mongoloid characteristics

Mongoloid populations possess a parabolic dental arch with large incisors and canines, smaller premolars, and relatively large molars. The incisors often show shovel-shaped anatomy, a common trait described in both anthropological and clinical literature. One of the most significant anatomical distinctions in Mongoloid dentition is the presence of an extra distal root (radix entomolaris) in the mandibular first molars. As noted in the study by Sankeertimala[8], these additional roots are shorter and more fused, which can complicate extraction. The risk of root fracture increases if this root is not identified preoperatively on radiographs[5,8].

The maxillary arch tends to be elliptical with a flat palatal vault. While the flat palate offers more favorable access during palatal approaches, the molar roots, being short and fused, are more resistant to elevation and luxation. This trait requires cautious separation and careful use of elevators.

The mandible in Mongoloid individuals is notably robust, with a broad ascending ramus and a moderate chin projection. According to Blumenfeld[24], their ramus is more vertical and wider compared to other groups. These traits influence the biomechanics of extraction and often require a more extensive mucoperiosteal flap or bone guttering for posterior surgical access.

3) Negroid characteristics

Negroid dentition is marked by a hyperbolic arch and a wide, rectangular palate, as described by Blumenfeld[24]. The teeth are generally smaller in size but exhibit greater spacing, including a midline diastema. This spacing can sometimes simplify extractions, especially in the anterior region, as interproximal access is better. Another distinguishing feature is the early eruption and complete presence of third molars, which often requires earlier treatment planning.

One of the most critical considerations in Negroid skulls is the pronounced alveolar prognathism. The maxilla and mandible both project forward, which shifts the angulation of tooth roots. This angulation may demand more buccal or lingual bone removal during extractions, especially when accessing multi-rooted teeth.

Negroid mandibles tend to be more gracile but show a steep gonial angle, a narrow posterior ramus, and an undulating lower border. Borrell and Williams[10] and others have reported that these individuals often have a long U-shaped arch with lower, wider rami and relatively medially positioned mental tubercles. These traits make flap elevation more variable and may affect access to the surgical field[10].

The role of bone quality cannot be understated in dental extractions. Denser bone increases resistance to force and often necessitates surgical intervention. van Spronsen et al.[25] found that mandibular length and angulation affect the pattern of jaw movement and muscle forces, which in turn can

Table 1. Table of characteristics

Study	Country	Population	Key focus	Significance to extraction	Theme
Cabral et al.[5] (2005)	Brazil	Simulated dental patients (Black vs. White)	Dentists recommended extractions more frequently for Black patients, showing racial bias in treatment planning.	Highlights implicit bias potentially leading to unnecessary extractions in minority populations.	Provider bias in extraction decision-making
Boykin et al.[7] (2009)	USA	Black and White dental patients	Black patients were more likely to choose extraction over root canal, driven by prior experience and systemic factors.	Demonstrates racial variation in treatment preferences, impacting extraction rates.	Patient-centered ethnic variation in extraction choices
Kressin et al.[28] (2003)	USA	Veteran Affairs dental patients	Black veterans were more likely to undergo extraction instead of root canal treatment.	Documents systemic racial disparities in definitive dental procedures like extractions.	Systemic disparities in extraction vs. restoration
Okunseri et al.[9] (2007)	USA	Ethnically diverse emergency dental patients	Race/ethnicity influenced likelihood of receiving extractions during emergency visits.	Highlights overrepresentation of minorities in emergency-based extractions.	Access-based ethnic disparities in extractions
Zhang et al.[12] (2019)	USA	Older adults, USA-born vs. immigrants	Foreign-born and minority adults had higher prevalence of untreated dental problems leading to tooth loss.	Suggests extraction often results from delayed care among ethnic minorities.	Delayed care leading to extractions in ethnic groups
Butani et al.[27] (2008)	USA	Immigrant families	Cultural beliefs affected acceptance of extraction and replacement procedures.	Cultural perspectives may influence decision to delay or refuse extractions.	Cultural beliefs influencing extraction timing
Borrell and Williams[10] (2022)	USA	Black and Hispanic adults	High rates of caries and tooth loss among ethnic minorities.	Tooth loss due to caries implies higher extraction rates among disadvantaged ethnic groups.	Caries-driven extractions in racial minorities
Arora et al.[29] (2016)	UK	South Asians, Blacks, and Whites	Differential extraction and filling rates by ethnicity despite similar caries prevalence.	Highlights extraction as a more common outcome among ethnic minorities.	Ethnic trends in extraction outcomes
Choi et al.[1] (2023)	USA	Asian immigrant adults	Limited health literacy in dental decisions, especially regarding extractions.	Poor literacy can lead to late presentations requiring extraction.	Health literacy and preventable extractions
Wang et al.[30] (2019)	USA	Various ethnic groups	Racial differences in root number, canal complexity, and crown size.	Complicates extraction techniques and surgical access by ethnicity.	Anatomical complexity and surgical extraction technique
Rawlani et al.[26] (2017)	India	Ethnic subpopulations	Morphological palatal differences among ethnic groups.	Influences maxillary stability and surgical access in extractions.	Palatal morphology in maxillary extraction planning
Sankeertimala[8] (2019)	India	Various racial groups	Trait-based racial variations in tooth shape and root structure.	Essential for anticipating extraction difficulties and technique modification.	Forensic odontology and extraction risk prediction
van Spronsen et al.[25] (1992)	Netherlands	Caucasians, Asians, African populations	Palatal shape and width vary among ethnicities.	Maxillary extraction techniques require ethnic-specific anatomical considerations.	Palatal anatomy and maxillary surgical access
Blumenfeld[24] (2011)	USA	Various ethnic groups	Nonmetric features like cusp pattern and root form linked to racial identity.	Such traits may require tailored extraction methods.	Anthropometric variability in extraction complexity

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Table 2. Racial characteristics relevant to tooth extraction

Theme	Reported anatomical traits in population groups	Clinical relevance to tooth extraction
Dental arch and palatal morphology	Caucasoid: V-shaped arch, narrow high palate Blumenfeld[24] (2011) Mongoloid: parabolic arch, flat palate Sankeertimala[8] (2019) Negroid: hyperbolic arch, wide rectangular palate Blumenfeld[24] (2011)	Palatal shape affects access and flap design; narrow arches increase risk of crowding and surgical difficulty
Root morphology and complexity	Caucasoid: splayed/bent molar roots Rawlani et al.[26] (2017) Mongoloid: fused/extra roots Sankeertimala[8] (2019) Negroid: single conical roots, more spacing	Complex roots may require sectioning and increase risk of fracture or incomplete extraction
Bone density and bite force	Higher mandibular bone mineral density in African descent; increased force needed, van Spronsen et al.[25] (1992)	Denser bone requires greater luxation force and may lead to higher complication risk during surgical extraction
Mandibular structure	Caucasoid: prominent chin, high gonial angle, Blumenfeld[24] (2011) Negroid: gracile mandible, wide ramus, Borrell and Williams[10] (2022) Mongoloid: robust with median chin, Blumenfeld[24] (2011)	Chin and ramus structure influence approach, flap extension, and risk of nerve injury
Third molar eruption patterns	Negroid: earlier eruption and more fully developed third molars, Arora et al.[29] (2016)	Early third molar eruption affects timing and necessity of extraction

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Table 3. Ethnic characteristics relevant to tooth extraction

Theme	Ethnic characteristic (cultural/behavioral)	Clinical relevance to tooth extraction
Access to dental care	Ethnic minorities have lower access to care due to dental deserts and systemic barriers: Borrell and Williams[10] (2022), Okunseri et al.[9] (2007)	Reduced access leads to delayed treatment and increased likelihood of extraction over restoration
Insurance and financial barriers	Higher extraction preference among uninsured minorities due to cost constraints: Choi et al.[1] (2023), Okunseri et al.[9] (2007)	Financial stress leads to preference for cheaper extraction procedures instead of root canal or prosthetics
Cultural perceptions and beliefs	Normalization of extractions and delay of care common in immigrant groups: Zhang et al.[12] (2019), Butani et al.[27] (2008)	Beliefs around inevitability of tooth loss result in delayed care and higher acceptance of extractions
Provider bias and decision-making	Bias in treatment planning leads to more extractions for minorities: Okunseri et al.[9] (2007), Borrell and Williams[10] (2022)	Clinician assumptions based on ethnicity may lead to biased treatment recommendations
Trust in healthcare system	Distrust of dental providers leads to delayed treatment and poorer outcomes: Boykin et al.[7] (2009), Kressin et al.[28] (2003)	Mistrust reduces follow-up and limits preventive care, pushing toward extraction as default
Language and communication barriers	Language barriers limit comprehension of alternatives to extraction: Zhang et al.[12] (2019), Butani et al.[27] (2008)	Communication gaps reduce informed decision-making and increase consent to extractions

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influence BMD.

Crawford et al.[31] compared different ethnic populations and found no significant differences in BMD at the mandibular body, bite force, or muscle activity. However, they did report significantly higher BMD at the ramus in African Caribbean populations when compared to Caucasians. This has clinical implications: denser bone in this region may reduce the efficacy of conventional elevation techniques and require more invasive approaches such as osteotomy, particularly during impacted molar extractions.

These physiological differences in BMD and masticatory muscle dynamics highlight the importance of tailoring force application, instrument selection, and even healing expectations based on the patient's ethnic background.

2. Ethnic characteristics and key themes affecting dental extractions

1) Ethnic minority populations consistently face limited access to dental services

Borrell and Williams[10] highlight how systemic racism limits its access to dental care for African American and Hispanic populations. The supporting themes have also been highlighted in Table 3. These communities often reside in "dental deserts" with low dentist-population ratios and a lack of minority dentists, impacting their ability to seek timely extractions or preventive care[10]. Okunseri et al.[9] found that African Americans and Hispanics received fewer restorative and prosthodontic procedures and were more likely to undergo

extractions, suggesting extraction may be disproportionately used as a treatment due to access or insurance issues[9].

2) Ethnic disparities in dental insurance status influence extraction decisions

Both Okunseri et al.[9] and Choi et al.[1] emphasized how uninsured or underinsured individuals—disproportionately represented by racial/ethnic minorities—were more likely to opt for extractions over costlier restorative options[1,9]. The "unknown" insurance status category in Okunseri's dataset largely consisted of patients who paid out of pocket—many of whom chose extractions over root canals due to affordability.

3) Cultural attitudes shape dental care-seeking behavior and acceptance of extractions

Butani et al.[27] found that among immigrant and ethnic minority families (especially South Asians), oral health may be de-prioritized until symptomatic, often resulting in extractions rather than preventive interventions. Zhang et al.[12] noted that Chinese immigrant parents were more accepting of extractions due to cultural beliefs associating dental disease with fate or aging, rather than preventable issues[12,27].

4) Ethnicity influences dentist-patient interaction and treatment planning

Okunseri et al.[9] and Borrell and Williams[10] document how dentists' treatment decisions can be subconsciously affected by patient race or ethnicity. African Americans, even in clinical training settings, were more likely to be offered extractions instead of more complex treatments. This trend persists regardless of the provider's own background, suggesting systemic bias in clinical decision-making.

5) Ethnic minorities may distrust dental providers or institutions, affecting treatment uptake

Kressin et al.[28] and Boykin et al.[7] highlight how past experiences of discrimination or perceived mistreatment can reduce trust in providers. As a result, patients may delay visits or decline complex treatments—defaulting to extractions when finally seen[7,28].

6) Language barriers reduce understanding of treatment alternatives

Zhang et al.[12] found that non-English-speaking caregivers of pediatric patients were less informed about options besides extraction and relied more on urgent dental care rather than ongoing maintenance. Butani et al.[27] reported that language mismatch with providers led to limited consent discussions, often resulting in quicker procedures like extractions.

3. Quality and level of evidence

The overall level of evidence identified in this scoping review should be interpreted as low to moderate, reflecting the heterogeneous and largely observational nature of the included literature. Studies addressing racial and ethnic disparities in extraction decisions and access to care were primarily cross-sectional, retrospective, or public health analyses, which provide useful evidence of associations but are limited in their ability to establish causality. Evidence relating to anatomical variation was largely derived from anthropological, forensic, or descriptive morphological studies; although these studies offer clinically relevant insights, their direct applicability to extraction outcomes and technique modification remains limited. Qualitative and sociocultural studies contributed important contextual understanding regarding beliefs, trust, language barriers, and care-seeking behavior, but findings varied across ethnic subgroups and healthcare settings. The quality of evidence assessment is summarised in Table 4.

IV. Discussion

Racial and ethnic factors can shape dental extraction procedures through population-level anatomical variation, sociocultural influences on treatment decisions, and disparities

Table 4. Quality and level of evidence

Evidence domain	Overall quality	Rationale
Access disparities and extraction vs. restoration	Moderate	Supported by multiple public health/clinical studies, but mostly observational
Provider bias in extraction decision-making	Low to moderate	Supported by clinical and simulated-patient evidence; causality/context vary
Cultural beliefs and delayed care	Low	Mainly qualitative or contextual evidence, heterogeneous populations
Anatomical variation relevant to extraction	Low	Mostly descriptive/forensic/anthropological evidence; limited direct clinical validation
Bone density and extraction difficulty	Very low to low	Limited direct evidence connecting bone mineral density differences to extraction outcomes

in access and quality of care. This review included 15 studies from various disciplines—clinical dentistry, forensic odontology, public health, and anthropology—spanning regions including the USA, India, the Netherlands, and East Asia. Study types ranged from cross-sectional observational studies, case-control designs, and forensic analyses to qualitative and policy-focused public health reports.

The findings suggest that population-level anatomical variation reported in the literature may influence extraction complexity, although the available evidence does not consistently validate specific clinical modifications. For instance, the study by van Spronsen et al.[25] confirmed significant variation in palatal morphology among ethnic groups, with narrower triangular palates more common in Caucasoids and broader elliptical vaults in Mongoloids, impacting surgical access. Similarly, the study by Sankeertimala[8] detailed racial differences in root complexity and tooth morphology, reinforcing the importance of modifying extraction technique based on expected anatomical challenges. These findings were corroborated by studies like the Race Determination by Nonmetric Traits review which emphasized increased root fusions and extra roots in certain ethnicities[8,24,28].

On the sociocultural front, ethnic variations in care-seeking behavior, preferences for extractions versus restorative care, and access disparities were well-documented. Butani et al.[27] and Kressin et al.[28] both highlighted how cultural expectations and historical mistrust in healthcare systems influence whether individuals pursue or avoid dental extractions[27,32]. The Okunseri et al.[9] study further confirmed that insurance status, racial background, and education level directly influenced the type of treatment offered—often favoring extraction over conservation in marginalized populations. These patterns align with broader themes in the literature, including Zhang et al.[12] and Choi et al.[1], who linked community-level structural inequities and provider bias to disparities in oral healthcare outcomes[1,12].

When compared to existing literature, our findings validate previous observations while providing a more integrated and structured synthesis. Prior reviews, such as Arora et al.[29], have reported racial differences in dental morphology but often failed to contextualize these variations within clinical extraction practices. Likewise, public health reports acknowledged disparities in oral healthcare utilization but lacked anatomical correlation. This scoping review uniquely bridges these domains by illustrating how race- and ethnicity-specific anatomical features interact with cultural and systemic influences, collectively shaping extraction decision-making and outcomes[21,33].

Some contradictions emerged across studies, particularly regarding the role of provider bias. While Butani et al.[27] emphasized cultural respect and awareness as mediators of trust and compliance, studies like Boykin et al.[7] pointed out persistent systemic racism in care delivery, highlighting underrepresentation of minority groups in the dental workforce and lower treatment quality in 'dental deserts.' Such conflicting narratives underline the need for more nuanced and intersectional research[7,31].

This review provides new insights by consolidating interdisciplinary evidence and revealing how anatomical traits and social determinants coalesce to influence dental extractions. These findings underscore the necessity of tailored surgical planning, equitable access to treatment options, and culturally competent care delivery. By doing so, this review contributes to developing informed, inclusive, and evidence-based dental protocols that better serve diverse populations. Interpreted through a social determinants of health lens, extraction outcomes appear to arise from the interaction of multiple domains: reported population-level anatomical variation, sociocultural beliefs and care-seeking behaviors, and systemic influences such as insurance status, access to care, language barriers, and provider bias. This framing helps distinguish descriptive biological findings from the structural and behavioral conditions that shape when patients present, which treatment options are offered, and which procedures are ultimately performed.

1. Limitations

Nonetheless, the study has some limitations that must be acknowledged. Although comprehensive, the literature search may have missed relevant non-English studies or grey literature with low visibility. The inclusion criteria prioritized human studies with dental or craniofacial relevance, which may have excluded broader anthropological work. The data synthesis was primarily qualitative due to heterogeneity in study design and outcome reporting. This limits direct comparisons and the ability to conduct meta-analysis. Moreover, given the overlap in the use of "race" and "ethnicity" across disciplines, some categorization challenges may have influenced theme allocation.

2. Clinical implications

Despite these constraints, the findings offer valuable impli-

cations for clinical practice. Understanding population-specific anatomical traits can guide safer extraction techniques, particularly for impacted or multirooted teeth. Simultaneously, awareness of cultural beliefs and systemic inequities should inform patient counselling, timing of extractions, and resource allocation. Dental education should incorporate both anatomical variation and cultural competence as core themes. Policy-level changes should also address provider diversity and geographic disparities in dental services.

3. Future directions

Future research should aim to quantify anatomical extraction difficulty across racial groups using clinical datasets, and further investigate how cultural beliefs shape decisions around tooth retention or removal. Longitudinal and interdisciplinary studies are needed to bridge gaps between anthropology, dentistry, and public health.

V. Conclusion

This review offers insight for dental practitioners, emphasizing the importance of considering ethnic factors and accordingly modifying their dental extraction techniques. The detailed exploration of anatomical variations and their implications provides practical insights for delivering patient-centered and culturally competent dental care.

ORCID

Netra Jayant Shah, *https://orcid.org/0009-0003-3433-5423*
Dhananjay Gandage, *https://orcid.org/0000-0003-0558-7384*
V. N. V. Madhav, *https://orcid.org/0000-0003-3187-6761*
Amit Jagtap, *https://orcid.org/0000-0002-2966-165*X
Saurabh Suresh Jain, *https://orcid.org/0000-0001-5563-181*X

Authors' Contributions

N.J.S., S.S.J. participated in data collection and writing the manuscript. N.J.S., S.S.J., V.N.V.M. participated in the study design and performed the statistical analysis. N.J.S., S.S.J., D.G., V.N.V.M., A.J. participated in the study design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

References

1. Choi SE, White J, Mertz E, Normand SL. Analysis of race and ethnicity, socioeconomic factors, and tooth decay among US children. JAMA Netw Open 2023;6:e2318425. https://doi.org/10.1001/jamanetworkopen.2023.18425
2. Newacheck PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America's children. Pediatrics 2000;105(Suppl 3):989-97. http://doi.org/10.1542/peds.105.S3.989
3. Gupta N, Vujicic M, Yarbrough C, Harrison B. Disparities in untreated caries among children and adults in the U.S., 2011–2014. BMC Oral Health 2018;18:30. https://doi.org/10.1186/s12903-018-0493-7
4. Hinton E, Paradise J. Access to dental care in medicaid: spotlight on nonelderly adults [Internet]. San Francisco (CA): KFF [cited 2025 Jul 16]. Available from: https://www.kff.org/medicaid/access-to-dental-care-in-medicaid-spotlight-on-nonelderly-adults/
5. Cabral ED, de França Caldas A Jr, Cabral HA. Influence of the patient's race on the dentist's decision to extract or retain a decayed tooth. Community Dent Oral Epidemiol 2005;33:461-6. https://doi.org/10.1111/j.1600-0528.2005.00255.x
6. Robison V, Wei L, Hsia J. Racial/ethnic disparities among US children and adolescents in use of dental care. Prev Chronic Dis 2020;17:E71. https://doi.org/10.5888/pcd17.190352
7. Boykin MJ, Gilbert GH, Tilashalski KR, Litaker MS. Racial differences in baseline treatment preference as predictors of receiving a dental extraction versus root canal therapy during 48 months of follow-up. J Public Health Dent 2009;69:41-7. https://doi.org/10.1111/j.1752-7325.2008.00091.x
8. Sankeertimala. Racial, occupational, and cultural variations in human teeth: teeth as evidence in forensic identification. Int. J Forensic Odontol 2019;4:7-10.
9. Okunseri C, Bajorunaite R, Matthew R, Iacopino AM. Racial and ethnic variation in the provision of dental procedures. J Public Health Dent 2007;67:20-7. https://doi.org/10.1111/j.1752-7325.2007.00004.x
10. Borrell LN, Williams DR. Racism and oral health equity in the United States: identifying its effects and providing future directions. J Public Health Dent 2022;82 Suppl 1:8-11. https://doi.org/10.1111/jphd.12501
11. Ettinger B, Sidney S, Cummings SR, Libanati C, Bikle DD, Tekawa IS, et al. Racial differences in bone density between young adult black and white subjects persist after adjustment for anthropometric, lifestyle, and biochemical differences. J Clin Endocrinol Metab 1997;82:429-34. https://doi.org/10.1210/jcem.82.2.3732
12. Zhang W, Wu YY, Wu B. Racial/ethnic disparities in dental service utilization for foreign-born and U.S.-born middle-aged and older adults. Res Aging 2019;41:845-67. https://doi.org/10.1177/0164027519860268
13. Hilton IV, Stephen S, Barker JC, Weintraub JA. Cultural factors and children's oral health care: a qualitative study of carers of young children. Community Dent Oral Epidemiol. 2007;35(6):429-438. doi:10.1111/j.1600-0528.2006.00356.x

14. Kiyak HA. Age and culture: influences on oral health behaviour. Int Dent J 1993;43:9-16.
15. Flores G, Vega LR. Barriers to health care access for Latino children: a review. Fam Med 1998;30:196-205.
16. Mertz E, Wides C, Calvo J, Gates P. The Hispanic and Latino dentist workforce in the United States. J Public Health Dent 2017;77:163-73. https://doi.org/10.1111/jphd.12194
17. Riedy CA, Weinstein P, Milgrom P, Bruss M. An ethnographic study for understanding children's oral health in a multicultural community. Int Dent J 2001;51:305-12. https://doi.org/10.1002/j.1875-595x.2001.tb00843.x
18. Hunt RJ, Slade GD, Strauss RP. Differences between racial groups in the impact of oral disorders among older adults in North Carolina. J Public Health Dent 1995;55:205-9. https://doi.org/10.1111/j.1752-7325.1995.tb02371.x
19. Watt R, Sheiham A. Inequalities in oral health: a review of the evidence and recommendations for action. Br Dent J 1999;187:6-12. https://doi.org/10.1038/sj.bdj.4800191
20. Wright JT, Vujicic M, Frazier-Bowers S. Elevating dentistry through diversity. J Am Dent Assoc 2021;152:253-5. https://doi.org/10.1016/j.adaj.2021.02.003
21. Calderon SJ, Mallory C. A systematic review of oral health behavior research in American adolescents. J Sch Nurs 2014;30:396-403. https://doi.org/10.1177/1059840514544034
22. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implement Sci 2010;5:69. https://doi.org/10.1186/1748-5908-5-69
23. Hilton M. JBI critical appraisal checklist for systematic reviews and research syntheses. J Can Health Libr Assoc 2024;45:180-3. https://doi.org/10.29173/jchla29801
24. Blumenfeld J. Racial identification in the skull and teeth. West Ont J Anthropol. 2011;8:20-33. https://doi.org/10.5206/uwoja.v8i1.8779
25. van Spronsen PH, Weijs WA, Valk J, Prahl-Andersen B, van Ginkel FC. A comparison of jaw muscle cross-sections of long-face and normal adults. J Dent Res 1992;71:1279-85. https://doi.org/10.1177/00220345920710060301
26. Rawlani SM, Rawlani SS, Bhowate RR, Chandak RM, Khubchandani M. Racial characteristics of human teeth. Int J Forensic Odontol 2017;2:38. https://doi.org/10.4103/ijfo.ijfo_21_16
27. Butani Y, Weintraub JA, Barker JC. Oral health-related cultural beliefs for four racial/ethnic groups: assessment of the literature. BMC Oral Health 2008;8:26. https://doi.org/10.1186/1472-6831-8-26
28. Kressin NR, Boehmer U, Berlowitz D, Christiansen CL, Pitman A, Jones JA. Racial variations in dental procedures: the case of root canal therapy versus tooth extraction. Med Care 2003;41:1256-61. https://doi.org/10.1097/01.MLR.0000094720.14790.B1
29. Arora G, Mackay DF, Conway DI, Pell JP. Ethnic differences in oral health and use of dental services: cross-sectional study using the 2009 Adult Dental Health Survey. BMC Oral Health 2016;17:1. https://doi.org/10.1186/s12903-016-0228-6
30. Wang J, Rousso C, Christensen BI, Li P, Kau CH, MacDougall M, et al. Ethnic differences in the root to crown ratios of the permanent dentition. Orthod Craniofac Res 2019;22:99-104. https://doi.org/10.1111/ocr.12288
31. Crawford SR, Burden AM, Yates JM, Zioupos P, Winwood K. OC1 facial bone mineral density: a potential indicator for at risk injury groups. Br J Sports Med 2014;48:A1. https://doi.org/10.1136/bjsports-2014-094245.1
32. Radmer TW, Johnson LT. The correlation of dental arch width and ethnicity. J Forensic Identif 2009;59:268-74.
33. Gadhia A, Pepper T. Oral surgery, extraction of teeth [Internet]. Treasure Island (FL): StatPearls Publishing [cited 2025 Dec 19]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK589654/

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