CRANIOFACIAL ABNORMALITIES AND MALOCCLUSION FINDINGS IN SICKLE CELL DISEASE RELATED TO ETHNIC-RACIAL POPULATIONS: A CRITICAL REVIEW OF THE LITERATURE

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Palavras-chave: Anormalidades Craniofaciais. Cefalometria. Maloclusão. Anemia Falciforme. Revisão de Literatura. Negros.

RESUMO

Introdução: a doença falciforme é uma doença hematológica, hereditária, crônica, que afeta principalmente, a população negra, em escala global. Na literatura odontológica, os achados craniofaciais e oclusais relacionados à doença falciforme são discordantes, mas, em comum, desconsideram a perspectiva racial. **Objetivo**: este artigo revisou criticamente a literatura odontológica e discutiu os achados encontrados na perspectiva racial/étnica. **Fonte dos dados**: estudos primários e secundários selecionaram 146 ocorrências de quatro bases de dados da literatura científica. Dois revisores extraíram independentemente os dados dos onze estudos incluídos. **Síntese dos dados**: com base na cefalometria lateral, a maioria dos estudos concluiu que as anormalidades craniofaciais e maloclusões, como protrusão maxilar, padrão esquelético de classe II, padrão de crescimento facial vertical, perfil facial convexo, retrusão mandibular e rotação posterior da mandíbula foram os mais comuns achados para pessoas com doença falciforme. No entanto, ao considerar a perspectiva étnico-racial, não há menção na maioria dos estudos de ajustes dos padrões cefalométricos específicos para as populações racializadas, nem tampouco são consideradas características do grupo populacional e da doença falciforme em si, como sua severidade, o momento de vida em que o diagnóstico ocorreu, número e período de hemotransfusões, internações, crises vaso-oclusivas ou uso de hidroxiureia. Além disso, a ampla faixa etária em diferentes períodos de crescimento ósseo e a ausência de informação sobre tratamento ortodôntico prévio foram observadas. **Conclusão**: há omissão sobre considerações étnico-raciais para relatar anormalidades craniofaciais e maloclusões sobre doença falciforme na literatura odontológica revisada. Isto pode ser uma expressão do racismo.

Keywords: Craniofacial Abnormalities. Cephalometry. Malocclusion. Sickle Cell Anemia. Literature Review. Blacks.

ABSTRACT

Introduction: sickle Cell Disease (SCD) is an inherited, hematological, chronic disease that mostly affects racial/ethnic groups. The dental literature discusses SCD's oral symptoms, such as malocclusion and craniofacial abnormalities, without considering the significance of a racial/ethnic perspective. **Objective**: this article critically reviewed the findings of the studies based on a racial/ethnic standpoint and SCD landmarks. **Sources of data**: primary and secondary searches selected 146 studies from four scientific literature databases. Two reviewers independently extracted data from eleven included studies. **Synthesis of data**: most studies used lateral cephalometry and reported craniofacial abnormalities and malocclusions, such as maxillary protrusion, class II skeletal patterns, vertical facial growth patterns, convex facial profile, mandibular retrusion, and the posterior rotation of the jaw. However, there is no mention of racial or ethnic cephalometric patterns to support these findings in the studied populations. In addition, a misunderstanding occurs when overlooking the different periods of growth or ages within and between the studied groups. Furthermore, there is no mention of previous orthodontic treatment. By contrast, there is a lack of information about the medically compromised health status of people with SCD, such as the life period of SCD's diagnosis; the number and timing of blood transfusions; the medical history of hospitalizations, vaso-occlusive crises, or hydroxyurea use. **Conclusion**: racial and ethnic concerns for the diagnosis of malocclusions and craniofacial anomalies, as well as SCD landmarks, are underappreciated in the examined dental literature. Discarding them also demonstrates institutional racism.

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INTRODUCTION

Sickle cell disease (SCD) is an inherited, progressive, life-threatening disease associated with a decreased quality of life and a shortened life span. This hematological genetic disease occurs by a higher presence of a recessive hemoglobin S mutation[1] with no gender predilection. SCD continues to be an example of healthcare inequity in Brazil and worldwide,[2] mainly for diasporic African groups[2-4] who present a high prevalence of this condition.[3-4]

SCD affects all organs, systems, and tissues.[5] The presence of acute pain crises, particularly in the long bones and joints; chronic anemia; organ failures; infections; and lung acute disorders indicate the severity of the condition.[5] In children, a reduction in the dimension of the upper airways can occur due to the overgrowth of the surrounding lymphoid tissues.[6] This may well explain a predisposition to upper airway obstruction syndrome.[7] Such changes can lead to mouth breathing, constitute a risk factor for malocclusion,[8] and even reduce the quality of life.[9,10] Sickle cell anemia is the most common type of SCD with the poorest prognosis,[1-5] including craniofacial and occlusion abnormalities.[11-12] The diagnose of SCD may occur during newborn screening.[1]

Blood transfusions, hospitalizations, and the use of medications, such as hydroxyurea, are part of the medically compromised routine of people with SCD. Hydroxyurea is one of the most widely used drugs on a global scale[5,13-17] and, as a myelosuppressive drug, inhibits or delays the proliferation of blood-forming cells in the bone marrow, particularly in individuals who have been taking this medication since childhood.[16-18] Hydroxyurea reduces the frequency of painful crises caused by the decreased life span of red blood cells and the defective vascular-endothelial qualities.[1-5]

Dental literature has reported many craniofacial and malocclusion alterations in people living with SCD.[12,14,19-22] As a protocol, to diagnose craniofacial and occlusal abnormalities, lateral cephalometric radiography is the most useful complementary exam,[23] as its traces illustrate the relationship between the bone bases, the facial profile (skeletal and soft tissue), and the growth pattern. For skeletal classification in orthodontic diagnosis and treatment planning, cephalometric measures for an “ideal” vertical and horizontal relationship are applied. In general, the Caucasian pattern is a reference guide, but for racial/ethnic groups, a better diagnosis is reached when applying standard measurements for this racial group[24] due to the relationship of normality between skeletal and dental positions that may be greatly diverse due to ethnic variations. In fact, there are dentoalveolar variations in Asian, Arabic, African, African-American, and African-Brazilian populations.[25]

Institutional racism is a group of practices, attitudes, and behaviors that harm people of color and is made up of unconscious bias, ignorance, carelessness, and racist stereotyping. A sign of institutional racism is not only the absence of a racial component in the studies, which is the case for SCD, especially for populations of African origin, but researchers also neglected to take into account the inner features of each studied group. These lead to biased scientific information and unsupported clinical intervention. This article seeks to advance scientific understanding by critically analyzing dental literature on craniofacial abnormalities and malocclusion findings in SCD from a racial perspective and some features of people living with SCD.

MATERIALS AND METHODS

Based on the study question: ‘Do the craniofacial and occlusal findings in SCD consider the features of people living with the disease for the cephalometric analysis in a racial/ethnic perspective?’ From January to February 2021, one researcher used the keywords Craniofacial Abnormality, Cephalometry, Malocclusion, and Sickle Cell Anemia to conduct database research on the Scielo, Lilacs, PubMed, and Virtual Health Library electronic sources. There were no restrictions on the period or categories of publications. The retrievals consist of full and free publications in English and Portuguese. Moreover, a manual search of each manuscript’s reference list was also conducted.

Two categories separated the studies based on title and abstract: A) Craniofacial and occlusal abnormalities measured by radiographic analysis, and B) Orthodontic treatment for people with sickle cell disease. In the sequence, group A split out into two sub-groups: A1 - craniofacial and occlusal findings measured using cephalometry; and A2: craniofacial and occlusal findings measured with non-cephalometric radiography exams. Only studies classified as group A1 were considered to answer the research question. Figure 1 shows the flowchart from identifying, selecting, including, and analyzing group A studies.

RESULTS

Table 1 summarizes the main findings. The majority of reviewed studies used lateral cephalometry to record craniofacial abnormalities and malocclusions[26-35]. None of the studies that reported on craniofacial abnormalities and malocclusions among different racial/ethnic groups with SCD mentioned racial/ethnic cephalometric parameters.

The maxillary protrusion,[26,29,32,35] the anteroposterior relation of the class II skeletal pattern,[28,29,31,33,34] malocclusion,[33] overjet,[28,34,35] and mandibular retrusion[29,32,35] were common findings. Malocclusion was more frequent, with greater overjet and labial tilt of the maxillary central incisors. By contrast, one study[30] and one systematic review[12] did not report any craniofacial abnormalities nor malocclusion, such as maxillary protrusion or compensatory maxillary expansion, in the SCD groups. On the other hand, one study[27] associated the findings in the cephalometric exams with the severity of SCD.

Table 2 shows craniofacial changes in various types of radiographs, except cephalometric radiography.[36-38] Maxillary and mandibular bone trabeculae alterations with a coarse trabecular pattern are the most common findings in sickle cell anemia patients.[36-38]

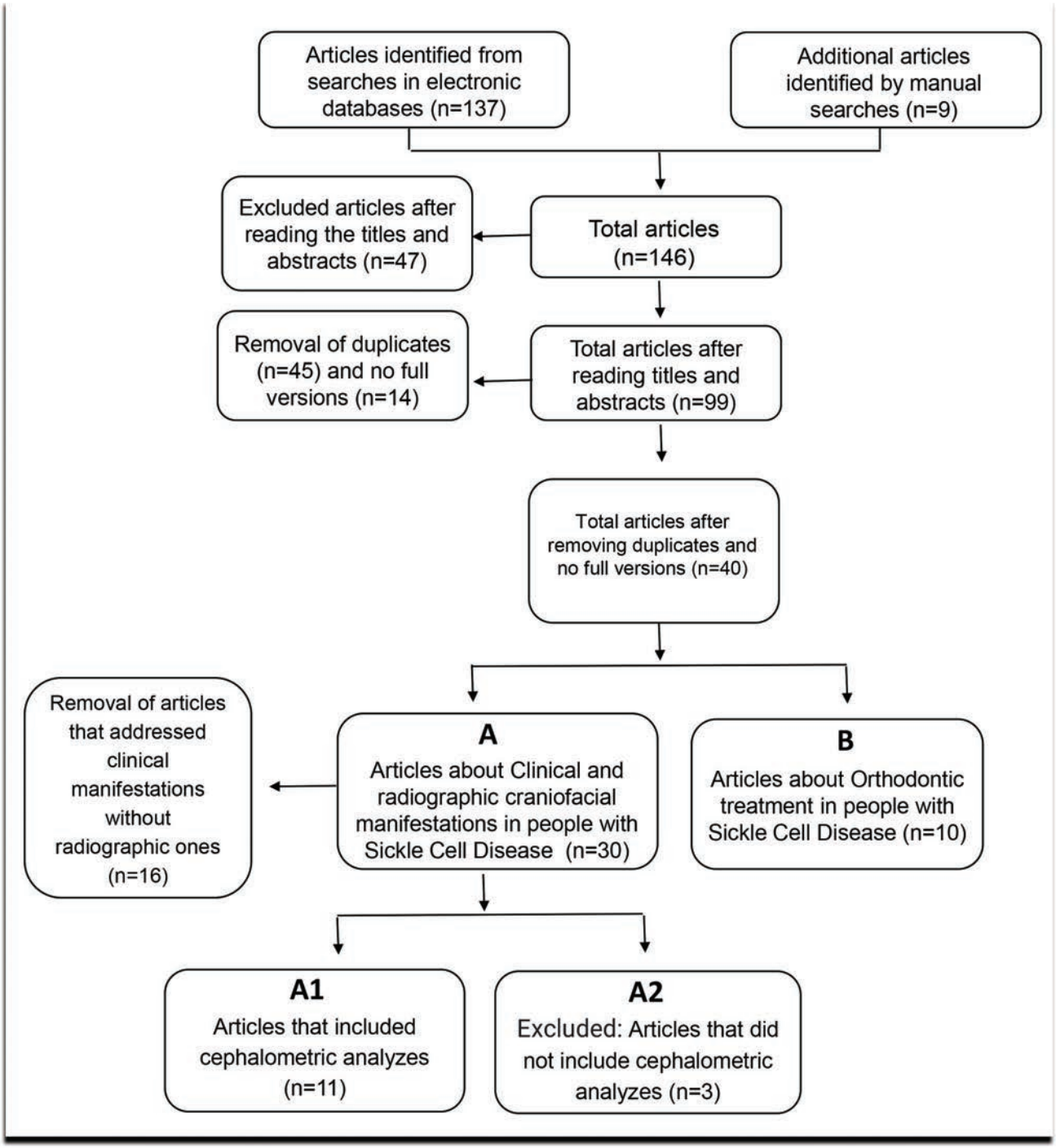


***Figure 1**: Flowchart of the search for the articles.*

***Table 1**: Main findings of included SCD studies related to craniofacial and malocclusion changes through cephalometric radiographs.*

Authors, year	Type/aim of the study	Study participants /age of participants	Age (years old)	Complementary diagnostic methods	Cephalometric findings	Craniofacial abnormalities and malocclusion
Brown & Sebes, 1986[26]	Case-control study/ Analysis of sickle cell gnathopathies	75 black individuals Sickle cell group: 50 Hb SS Control group: 25 Hb AA	Sickle cell group: 16 - 50 Control group: 18 - 49	Lateral cephalometry	No significant differences were found for mean SNA angles between groups. (Hb SS: 82.54°; Hb AA: 81.76°) Increased Mean palate-alveolar ridge angle for sickle cell group (p<0.01)	Maxillary protrusion is due to an increase in the palate-alveolar ridge angle and not to the increased length of the hard palate.
Kavadia-Tsatala *et al.*, 2004[27]	Cross-sectional study/Associate radiopaque lesions situated in the course of a known vessel or in the apical region of the teeth in the mandible with vaso-occlusive crises in sickle cell disease	42 Greeks with sickle cell disease	Sickle cell group: 20 - 65	Ortho and anteroposterior panoramic radiographs and lateral cephalometry	Findings related to the severity of Sickle Cell Disease and did not correlate with craniofacial abnormalities and malocclusion measured by Cephalometry.	Strong association with difficulties in diagnosis and treatment. Vaso-occlusive crises result in oral problems
Licciardello *et al.*, 2007[28]	Case-control study/ Evaluate the craniofacial morphology of Caucasians with sickle cell disease	72 Caucasian individuals: Sickle cell group: 14 Hb SS 13 Hb S-β0 9 Hb S-β+ Control group: 36 Hb AA individuals	Sickle cell group: 18.5 - 51.1 Control group: 18.5 - 51.2	Lateral cephalometry	All linear and angular measurements SNA angles: Hb SS/ Hb S-β0/ Hb S-β+: 80.5° Hb AA: 80.4° SNB angles: Hb SS/ Hb S-β0/ Hb S-β+: 76.7° Hb AA: 77.5°	Vertical pattern of the face, posterior rotation of the mandible, and labial inclination of the upper incisors.

Note: Hb SS – Sickle cell anemia genotype; Hb AA – normal hemoglobin genotype ; Hb S-β0 - Hb-S-beta 0 thalassemia; Hb S-β+ Hb-S-beta + thalassemia - SNA angle - angle formed by the sella–nasion–A points; SNB angle - angle formed by the sella–nasion–B points. %U – percentage Unknown.

***Table 1**: Main findings of included SCD studies related to craniofacial and malocclusion changes through cephalometric radiographs.*

Authors, year	Type/aim of the study	Study participants /age of participants	Age (years old)	Complementary diagnostic methods	Cephalometric findings	Craniofacial abnormalities and malocclusion
Costa *et al.*, 2012[12]	Review article/ Critically review craniofacial bone abnormalities and malocclusion in sickle cell disease.	Two studies[26,29] of seven studies including black people, from 10 to 46 years old. 60 black individuals	10-45[26] 20-46[29]	Radiographic and cephalometry analysis [26,29]	Maxillary protusion (%U)[26] Maxillary protusion (%U), Mandibular retrusion (%U), Increased mandibular plane (%U) Convex facial profile (%U)[29]	No evidence for sickle cell disease as a risk factor for craniofacial bone abnormalities and malocclusion.
De Souza *et al.*, 2008[29]	Case-control study/ Evaluate and quantify craniofacial skeletal alterations in SCD	Sickle cell group: 30 black Hb SS patients Control group: 30 black Hb AA patients with normal occlusion	Sickle cell group: over 18 Control group: over 18	Lateral cephalometry with Steiner and Downs tracings	Mean SNA angles: Hb SS: 85.42° Hb AA: 88.2° Mean SNB angles: Hb SS: 78.35° Hb AA: 84.82°	Maxillary Protrusion;Mandibular Retrusion;Increase in the Mandibular Plane;Convex facial profileClass II Skeletal Pattern
Maia *et al.*, 2011[30]	Cross-sectional study/Characterize the craniofacial pattern in SCD	50 Hb SS individuals without race description.	Sickle cell group: 18 - 43	Front and side photographs and lateral cephalometry	Mean SNA angle - Hb SS: 84.56° Mean SNB angle - Hb SS: 80.12°	No craniofacial pattern was associated; No compensatory maxillary expansion; Maxilla length reduction (64%); Absence of maxillary protrusion (69%)

Note: Hb SS – Sickle cell anemia genotype; Hb AA – normal hemoglobin genotype ; Hb S-β0 - Hb-S-beta 0 thalassemia; Hb S-β+ Hb-S-beta + thalassemia - SNA angle - angle formed by the sella–nasion–A points; SNB angle - angle formed by the sella–nasion–B points. %U – percentage Unknown.

***Table 1**: Main findings of included SCD studies related to craniofacial and malocclusion changes through cephalometric radiographs.*

Authors, year	Type/aim of the study	Study participants /age of participants	Age (years old)	Complementary diagnostic methods	Cephalometric findings	Craniofacial abnormalities and malocclusion
Pithon *et al*., 2014[31]	Case-control study/ Identify craniofacial characteristics of patients with sickle cell anemia and sickle cell trait	45 individuals, without race description Sickle cell group: 15 Hb SS patients Sickle cell trait group: 15 Hb AS patients Control group: 15 Hb AA patients	mean age 20.8	Lateral cephalometry	Mean SNA angles: Hb SS: 83° Hb AS: 82.1° Hb AA: 79.7° Mean SNB angles: Hb SS: 77.5° Hb AS: 78.3° Hb AA: 77.9°	No compensatory maxillary expansion for the sickle cell trait and sickle cell disease groups. Class II Skeletal Pattern for sickle cell disease group
Santos *et al*., 2018[32]	Observational study/ Evaluate and describe cephalometric patterns of individuals with sickle cell disease	40 individuals (38 black people; 02 did not inform race/ ethnicity) Sickle cell group: 16 Hb SS patients 11 Hb SC patients No mentioned genotype group 13 patients	Over 19	2D and 3D lateral cephalometry using Steiner and McNamara tracings	Mean SNA angles: 2D - sickle cell group: 82.22° 3D - sickle cell group: 83. 04° Not informed for other groups Mean SNB angles: 2D - sickle cell group: 80.07° 3D - sickle cell group: 79.93° Not informed for other groups	Maxillary Protrusion Mandibular Retrusion

Note: Hb SS – Sickle cell anemia genotype; Hb AA – normal hemoglobin genotype ; Hb S-β0 - Hb-S-beta 0 thalassemia; Hb S-β+ Hb-S-beta + thalassemia - SNA angle - angle formed by the sella–nasion–A points; SNB angle - angle formed by the sella–nasion–B points. %U – percentage Unknown.

***Table 1**: Main findings of included SCD studies related to craniofacial and malocclusion changes through cephalometric radiographs.*

Authors, year	Type/aim of the study	Study participants /age of participants	Age (years old)	Complementary diagnostic methods	Cephalometric findings	Craniofacial abnormalities and malocclusion
Basyouni *et al*., 2018[33]	Case-control study/ Determining malocclusion and craniofacial characteristics in adolescents with sickle cell disease	236 Saudi individuals. Sickle cell group: 112 patients Control group: 124 Hb AA patients	12-18	Digital Lateral Cephalometry	Mean SNA angles: Sickle cell group: 86.7°; Control group Hb AA: 81.5°. Mean SNB angles: Sickle cell group: 76.8°; Control group Hb AA: 79.5°	Higher prevalence of malocclusion (87.5%) in sickle cell group Greater need for orthodontic treatment in the sickle cell group
Pashine *et al*., 2020[34]	Case-control study/ Evaluate the craniofacial and occlusal characteristics of children with sickle cell anemia	100 individuals between without race/ethnicity description Sickle cell group: 50 Hb SS patients Control group: 50 Hb AA patients without any systemic disease	10 - 18	Dental Models and lateral cephalometry	Mean SNA angles Hb SS: 83.12° Hb AA: 84.1° Mean SNB angles: Hb SS: 77.18° Hb AA: 79.52°	Delay in tooth eruption Tendency to dental Class II (60%) and skeletal with a vertical facial growth pattern Increased overjet (62%) and overbite.
Ferreira *et al*., 2020[35]	Case-control study/ Identify the main characteristics regarding the craniofacial shape and size in patients with sickle cell trait and sickle cell anemia	45 patients including children, teenagers, and adults. No description of race/ ethnicity. Sickle cell group: 15 Hb SS patients Sickle cell trait group: 15 Hb AS patients Control group: 15 Hb AA patients	Mean age 20.8.	Lateral Cephalometry	No quantitative measures related to SNA and SNB angles	Tendency to a maxillary protrusion Mandibular Retrusion A labial tilt of the maxillary central incisors, which may suggest maxillary protrusion

Note: Hb SS – Sickle cell anemia genotype; Hb AA – normal hemoglobin genotype ; Hb S-β0 - Hb-S-beta 0 thalassemia; Hb S-β+ Hb-S-beta + thalassemia - SNA angle - angle formed by the sella–nasion–A points; SNB angle - angle formed by the sella–nasion–B points. %U – percentage Unknown.

***Table 2**: Main findings of non-included SCD studies related to craniofacial and malocclusion changes through panoramic, periapical, and interproximal radiographs.*

Authors, year	Type/aim of the study	Study participants/age of participants	Diagnostic methods	Described findings
Mourshed *et al*., 1974[36]	Case-control study/ Incidence and frequency of radiographic features in SCD	58 individuals Sickle cell group08 black patients with Hb SS and Hb SC without distinction between them 50 random radiographs of healthy people	Panoramic, periapical, and interproximal radiography	Mandibular radiolucency and coarse bone trabeculae in 85% of patients with sickle cell disease
Arowojolu *et al*., 1997[37]	Case-control study/Compare alveolar bone patterns of individuals with SCD	100 black people Sickle cell group: 50 Hb SS patients Control group: 50 Hb AA patients	Periapical radiography	No findings
Souza *et al*., 2018[38]	Case-control study/Estimate the association between sickle cell anemia and sickle cell trait with dental and mandibular changes and bone abnormalities	369 participants (54 Caucasians, 104 blacks, and 211 of other races/ethnicities) Sickle cell group: 123 Hb SS patients Sickle cell trait 123 Hb AS patients Control group: 123 Hb AA patients	Periapical radiography	Changes in maxillary bone trabeculae (69.4%) and mandibular bone trabeculae (78.1%) in Hb SS individualsPartial or total loss of lamina dura more prevalent in Hb SS and Hb AS

DISCUSSION

One way structural racism appears is when data produced from limited usage of theoretical and conceptual frameworks result in inadequately interpreted search results.[39] Racial prejudice prevents objective evaluation and sharing of study findings. A clear example is the non-racialized treatment of sickle cell patients.[40] In contrast to this trend, we searched the dental literature for craniofacial and malocclusion abnormalities linked to SCD. Based on lateral cephalometry, most studies conclude that craniofacial and occlusal anomalies, such as maxillary protrusion, the class II skeletal pattern, the vertical facial growth pattern, a convex facial profile, mandibular retrusion, and the posterior rotation of the jaw are the most common findings for people with SCD. However, there is no mention of racial or ethnic features related to specific cephalometric patterns. This is the main weakness of the reviewed studies and, consequently, of their findings.

First, it is important to mention that the bimaxillary protrusion resulting from the more labial positioning of maxillary and mandibular incisors is a common finding in African-descent populations. Previous cephalometric studies on the Brazilian black population with excellent occlusion showed the presence of protrusion of the gnathic bones as a pattern,[41] indicating a value for the SNA angle that was higher than that found in the SCD studies. Moreover, several studies have described dentoalveolar variations in Asian, Arabic, African, African-American, and African-Brazilian populations.[24,25,42] In Brazil, young African-Brazilian adults presented differences regarding dental and craniofacial characteristics when compared to European-American norms. Therefore, the cephalometric norms for some ethnic groups should be regarded carefully.[24,25,42] Cephalometric exams in patients with SCD must take into account the characteristics of specific groups in order to detect abnormalities. This action aids in optimizing the dental management of people with SCD, but it also increases the quality of study designs or the development of technologies, like cephalometric analysis using artificial intelligence, for example.

This viewpoint explained the variation among the examined studies. For example, for black individuals in a group with SCD, Brown *et al.*[26] and De Souza *et al.*[29] reported maxillary protrusion and mandibular retrusion related to the 85.42° and 82.54° SNA angles, respectively. On the other hand, Licciardello *et al.*,[28] when evaluating Caucasian patients with sickle cell anemia or beta-thalassemia in comparison with control groups, found a mean SNA angle value of 80.5° for the three groups, and thus concluded that there is no tendency to maxillary protrusion. Cephalometric findings in Sicilian patients only indicated a trend towards a more vertical face pattern. Maia *et al.*[30] and Pithon *et al.*[31] found mean values for the SNA cephalometric angle of 84.56° and 83° for people with sickle cell anemia, and 82.1° for those with a sickle cell trait. These values are within the standard deviation of the angle. There is no doubt that the adoption of cephalometry to diagnose craniofacial and malocclusion abnormalities in SCD should consider ethnic and racial plurality.

Another important point refers to the age of the cases and control groups concerning the craniofacial and occlusal features. As seen in Pashine's study,[34] the authors used an index not designed for mixed dentition to evaluate craniofacial and occlusal characteristics of children with sickle cell anemia. In addition, the authors described craniofacial patterns between young and adult patients as a comparable group,[26,33-35,37] which is a bias. Adults have complete bone growth, as opposed to younger children and teenagers, aged 10 to 18 years, who have transitory periods. In this phase, the occlusion is unstable because a series of specific alterations occur in the dental arch due to age,[38] along with bone growth, which are the factors that compromise the reliability of the findings.

Finally, there is no information about the medically-compromised health status of participants with SCD in the literature, such as their period of diagnosis, the frequency of pain crises, hospitalizations, blood transfusions, or their use of hydroxyurea or other medications. As known, these factors influence craniofacial and malocclusion patterns.[43] Furthermore, there was no mention of previous orthodontic treatment in the case or control groups in any of the reviewed papers.

Studies with sickle cell anemia patients[44,45] associated the compensatory growth of the bone marrow due to the intense production of blood cells, a phenomenon called hematopoiesis, with maxillary hyperplasia and changes in the dimension of the bone structure[27,34-35] as a response to hemolysis. Within a physiological process, there is a great demand for oxygen for the growth and development of the maxilla, leading to bone expansion. The lack of information about the use of hydroxyurea by the participants is another confounding factor, as this medication causes myelosuppression and modulates medullary bone activity on the compensatory expansion of the jaws. Silva-Pinto *et al.*,[17] and Sant'Ana *et al.*[18] showed an increase in hemoglobin, fetal hemoglobin, and mean corpuscular volume, and a decrease in leukocytes and neutrophils,[16-19] representing a considerable improvement in the clinical and laboratory parameters of those who use hydroxyurea.[18] In addition, the amount of fat in the bone marrow of people with SCD is

associated with hemolysis and the regulation of bone marrow activity,[46] especially in children that have used hydroxyurea since childhood. Hydroxyureia is the main medication used to prevent pain crises and reduce the need for blood transfusions.[47] However, none of the reviewed studies indicated the level of "hematopoietically active" bone marrow as the inclusion criteria of case and control participants, nor did the use of Hydroxyureia medication in the case group.

As previously, stated, craniofacial and occlusal alterations in SCD did not occur systematically and recurrently in all people. There are exogenous and endogenous factors,[48] such as racial features and access to health services.[48] However, for Powers-Hays and McGann,[40] unfortunately, the social construct of race in America requires the majority of patients with SCD not only to face the consequences of a serious health condition, but also to navigate a society in which the color of their skin is often an unfair disadvantage.[40] Researchers should have considered this perspective.

Consisting of unconscious bias, ignorance, carelessness, and racist stereotyping, institutional racism is a collection of practices, attitudes, and behaviors that harm people of color. The absence of a racial component in the studies is a sign of institutional racism, which is the situation for SCD, particularly in populations of African descent. The presumption is that this information is irrelevant. Similar to this, several studies failed to mention whether or not a person used hydroxyurea or whether they received a diagnosis as a result of newborn screening. Despite this, the conclusions were extended more broadly to all groups, regardless of their internal characteristics. This produces skewed scientific data and unnecessary clinical action.

In fact, to have reliable knowledge about the oral health of people with SCD, high-quality studies must assume the proxy structured racism, both institutional and interprofessional, and link them to the well-defined data extraction from lifestyle complementary exams, and clinical characteristics, for oral manifestations in general, and craniofacial abnormalities and malocclusion in particular.

The study's limitations are due to the fact that this is a review study and that, despite being structured, the search and selection process might not have found all pertinent studies. Another issue is that the academic literature in the form of theses and dissertations was not included, which could have resulted in misunderstandings due to a lack of knowledge.

CONCLUSION

In the reviewed dental literature, racial/ethnic considerations, and SCD landmarks are underestimated. There are no racial/ethnic standpoints for craniofacial abnormalities and malocclusion diagnosis in SCD. In addition, there is no mention of important characteristics for patients with SCD. Both findings express structured racism.

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