



Prevalence of class I skeletal malocclusion in an orthodontic population: a cross-sectional study

Davide Rizzi ¹  0009-0001-2322-1696
Ana Patricia Martins ¹  0009-0000-8289-0294
Evelina Scopelliti ¹  0009-0009-5361-5686
Maria Gabriel Araújo Queirós ¹  0000-0003-2115-6066
Ana Cristina Gião Carvalho ¹  0000-0003-0973-8418
Maria da Conceição Manso ^{1,2}  0000-0002-1774-1337
Mónica Morado Pinho ¹  0000-0003-2373-1669

¹ Faculty of Health Sciences, Fernando Pessoa University, Porto, Portugal

² RISE-Health, Faculty of Health Sciences, Fernando Pessoa University, Porto, Portugal

ARTICLE INFO

Received 24 April 2026

Accepted 18 June 2026

Keywords:

orthodontics
dental occlusion
skeletal class I malocclusion
cephalometry

Corresponding Author:

Mónica Morado Pinho; Fernando Pessoa University - Faculty of Health Sciences, Porto, Portugal; monicap@ufp.edu.pt

ABSTRACT

Introduction: Skeletal malocclusions result from diverse craniofacial growth patterns. Even individuals with an apparently balanced skeletal relationship (Class I) can present significant dental discrepancies, impacting aesthetics and function.

Objectives: This cross-sectional study aimed to determine the prevalence and distribution of skeletal Class I malocclusions in orthodontic patients at the Fernando Pessoa University Teaching Hospital, Gondomar, and to evaluate clinical variability and its relationship with other diagnostic variables.

Methodology: A retrospective analysis was conducted on 143 lateral cephalometric radiographs (89 females, 54 males; aged ≥ 9 years; mean age 23.6 ± 14.5 years). Skeletal classification was assessed using Ricketts analysis via WebCeph, an AI-based platform requiring careful manual verification of cephalometric landmarks. Skeletal Class I was defined by a facial axis angle of $87^\circ \pm 3^\circ$. Occlusal variables—Angle's Classification of molar and canine relationships, overjet, overbite, transverse bite, and dental anomalies of number and form—were evaluated using orthopantomography, intraoral photographs, and study models.

Results: Skeletal Class II was the most prevalent (49.6%), followed by Class I (37.8%) and Class III (12.6%). High occlusal variability was observed within the Class I group, confirming that

Contributions: Conceptualization: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Data curation: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Formal Analysis: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Funding acquisition: Not applicable; Investigation: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Methodology: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Project administration: DR, APM, ES, MGAQ, ACGC and MMP Resources: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Software: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Supervision: DR, APM, ES, MGAQ, ACGC and MMP; Visualization: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Writing – original draft: DR, APM, ES, MGAQ, ACGC, MCM and MMP; Writing – review & editing DR, APM, ES, MGAQ, ACGC, MCM and MMP.

Please cite this article as: Rizzi D, Martins AP, Scopelliti E, Queirós MGA, Carvalho ACG, Manso MCM, Pinho MM. Prevalence of class I skeletal malocclusion in an orthodontic population: a cross-sectional study. *Athena Health & Research Journal*. 2026; 3(Suppl. 2). doi: 10.62741/ahrj.v3iSuppl. 2.168

DOI: 10.62741/ahrj.v3iSuppl.2.168

This article is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License.

skeletal balance does not guarantee ideal occlusion. Most Class I patients showed jaw positions within normal parameters.

Conclusions: Skeletal Class I was the second most prevalent pattern, displaying marked occlusal heterogeneity. These findings confirm the lack of direct correspondence between skeletal pattern and dental occlusion, highlighting the need for individualized orthodontic planning even in skeletally balanced patients.
