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Comparative Analysis of Sleep Quality Across Skeletal Class I and Class II Using the Pittsburgh Sleep Quality Index

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Introduction

Quality sleep is vital for overall health, and the Pittsburgh Sleep Quality Index (PSQI) serves as a key tool for its assessment. In orthodontics, skeletal sagittal discrepancies are evaluated through cephalometric analyses, such as the SNA, SNB, and ANB angles. Emerging evidence suggests that the positional relationship of the jaws may alter airway dimensions, potentially affecting sleep quality. This study is a preliminary investigation aiming to examine the association between skeletal classification (Class I, Class II, and Class II subtypes) and and PSQI scores, and to analyze the correlations between cephalometric measurements (SNA, SNB, and ANB) and PSQI scores.

Materials and Methods

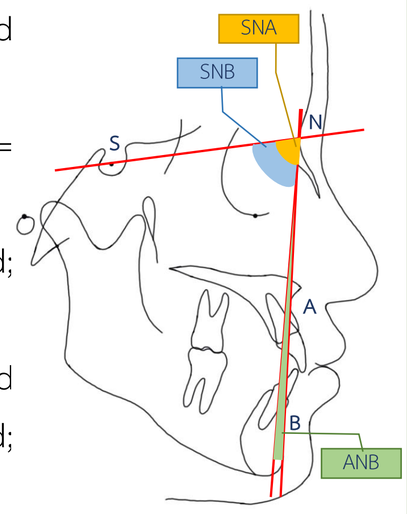
A total of 59 participants, aged 18 to 50 years, were recruited from an orthodontic clinic. Cephalometric analyses were performed using Dolphin Imaging 11.95.08.50.

Participants were categorized based on Thai normative values:

- Skeletal Class I (Sk-I; *n* = 30): ANB angle between 0.5°–5.1°
- Skeletal Class II (Sk-II; *n* = 29): ANB angle > 5.1°

The Skeletal Class II group was further divided into three subtypes:

- Prognathic maxilla (Sk-II Prog mx; *n* = 10): SNA > 88.1°
- Retrognathic mandible (Sk-II Retrog md; *n* = 12): SNB < 78.0°
- Combined prognathic maxilla and retrognathic mandible (Sk-II combined; *n* = 7): SNA > 88.1° and SNB < 78.0°



Sleep quality was assessed using the Thai-Pittsburgh Sleep Quality Index (Thai-PSQI). The total of the seven subcomponent scores results in a global PSQI score ranging from 0–21. A total global PSQI score of 5 or less indicates good sleep quality, while a score greater than 5 indicates poor sleep quality.

Descriptive statistics were used to report the means and standard deviations for each group. The Mann–Whitney U test and Kruskal–Wallis test were used to compare PSQI scores among the groups, with statistical significance set at 0.05. Correlations between SNA, SNB, ANB, and PSQI were analyzed using Spearman's rank correlation, with statistical significance set at 0.05.

Result

Demographic and Cephalometric Results

- *Sample Baseline:* 59 participants showed no significant differences in sex, age, or BMI ($p > 0.05$).
- *Group Comparison:* The Sk-II group exhibited significantly higher ANB value than the Sk-I group ($p < 0.001$), confirming Class II morphology characterized by the anatomical interplay of maxillary protrusion and mandibular retrusion.
- *Subtype Findings:*
  - SNA Angle: Significantly higher in the Sk-II Prog mx subgroup compared to other Class II subtypes ($p < 0.001$).
  - SNB Angle: Significantly lower in the Sk-II Retrog md subgroup compared to other Class II subtypes ($p < 0.001$).

Comparison of Sleep Quality (PSQI)

Figure 1: Comparison of Global PSQI scores among skeletal classes and Class II subtypes. The dashed line indicates the threshold for poor sleep quality (PSQI > 5)

Global PSQI scores indicated poor sleep quality (mean > 5) across all groups, but no statistically significant differences were found between Skeletal Class I (6.16±2.35) and Class II (6.24±3.03) ($p > 0.05$). Similarly, no significant differences were observed among Class II subtypes in total PSQI scores (Sk-II Prog mx; 5.90±2.23, Sk-II Retrog md; 6.58±4.10, and Sk-II combined; 6.14±2.04) ($p > 0.05$).

Correlation Analysis

A significant moderate negative correlation was found specifically in the Sk-II Prog mx subgroup between the ANB angle and PSQI score ($r = –0.685$, $p < 0.05$). This suggests that a more anteriorly positioned maxilla may be associated with better sleep quality, possibly due to enlarged pharyngeal airway dimensions. In contrast, no significant correlations were observed in in the Sk-I group, the overall Sk-II group, or other Sk-II subtypes.

Table 1: Spearman's rank correlation of ANB with PSQI

Groups and subgroups	rho	p value
Sk-I group (*n* = 30)	0.254	0.175
Sk-II group (*n* = 29)	–0.210	0.274
Sk-II Prog mx subgroup (*n* = 10)	–0.685	*0.029
Sk-II Retrog md subgroup (*n* = 12)	0.147	0.649
Sk-II combined subgroup (*n* = 7)	0.275	0.551

* Correlation is significant at $p < 0.05$ (2-tailed).

Conclusion

This study indicates that skeletal pattern alone does not significantly influence subjective sleep quality, although a more anterior maxillary position was associated with better sleep outcomes. We hypothesize that this improvement may be attributed to a more favorable upper airway configuration, though this remains a preliminary observation. Given that skeletal morphology does not consistently correlate with patients' perceived sleep quality, orthodontists should not rely solely on cephalometric measurements (SNA, SNB, ANB) for assessment. Therefore, integrating sleep questionnaires into pre-treatment screening is recommended. Since this study was exploratory, future research with larger sample sizes and direct airway assessments is necessary to validate these findings and refine clinical decision-making in orthodontic and orthognathic treatments.

References

Buysse, D. J., Reynolds, C. F., 3rd, Monk, T. H., Berman, S. R. and Kupfer, D. J. 1989. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 28(2): 193–213. doi: 10.1016/0165-1781(89)90047-4

Daskalogiannakis, J. 2000. Glossary of orthodontic terms. Quintessence Books. Michigan, USA.

El, H. and Palomo, J. M. 2013. An airway study of different maxillary and mandibular sagittal positions. Eur J Orthod 35(2): 262–270. doi: 10.1093/ejo/cjs008

Pornsuksiri, B., Sirichompun, C. and Panmekiate, S. 2013. A comparison of upper airway dimensions in a group of Thai orthodontic patients with different skeletal types. CU Dent J 36: 9–20. doi: 10.58837/CHULA.CUDJ.36.1.2

Samman, N., Mohammadi, H. and Xia, J. 2003. Cephalometric norms for the upper airway in a healthy Hong Kong Chinese population. Hong Kong Med J 9(1): 25–30.

Sutthiprapaporn, P., Manosudprasit, A., Pisek, A., Manosudprasit, M., Pisek, P., Phaoseree, N. and Manosudprasit, A. 2020. Establishing esthetic lateral cephalometric values for Thai adults after orthodontic treatment. Khon Kaen Dent J 23(2): 31–41.

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