

## ORTHODONTIC TYPOLOGY OF OBSTRUCTIVE SLEEP APNEA SYNDROME IN MAHAJANGA, MADAGASCAR

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### ABSTRACT

**Purpose:** The aim of our study was to describe the orthodontic typology of students with OSA in Mahajanga Madagascar.

**Material and methods:** This is a cross-sectional descriptive study on a student population of the University of Mahajanga Madagascar on World Health Day in 2024 at the university campus. Sampling was conducted in simple randomness. The data was analyzed on the SPSS 25.0 software.

**Results:** The survey identified 120 students with a sex ratio of 0.84. The average age was 22 years. The prevalence of OSA was 11.6%. The classification of the shift of the bony bases

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was dominated by Class I at 50% of students who had OSA. The exooral examination of the profile in the sagittal direction evaluated a convex profile at 85.7%.

**Conclusion:** OSA is a serious underdiagnosed pathology in Madagascar. The declining intellectual level of students could have something to do with their hidden health situation. Dentofacial Orthopedics participates in the screening of this pathology in order to improve the health of the population in our country.

**Key words:** Obstructive sleep apnea, Madagascar, Dentofacial orthopedics.

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## 1. Introduction

Obstructive sleep apnoea syndrome (OSA) is defined by the occurrence of abnormally frequent episodes of complete or partial obstruction of the upper airway during sleep, resulting in total interruption (apnea) or significant reductions (hypopnea) in ventilation [1]. Obstructive sleep apnea-hypopnea syndrome (OSAHS) is feared, in addition to the cardiovascular complications it can induce or increase, for chronic fatigue, excessive daytime sleepiness, but also for the difficulties in concentration and attention to which it exposes [2]. The literature review reports the prevalence of OSA in the general population in the order of 4 to 5% of men and 2% of women [3]. Sleep disorders are extremely common (40-86%) in children and adolescents [4]. Obstructive Sleep Apnea Syndrome (OSA) can have an impact on attention and learning skills. The student population may be confronted with this pathology which can alter its ability to assimilate. The objective of our study was to describe the orthodontic typology of students with OSA in Mahajanga Madagascar.

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## 2. Materials and methods

This is a cross-sectional descriptive study. The study is carried out on a student population of the University of Mahajanga Madagascar during the University Health Week dedicated to World Health Day in April 2024 at the university campus. Sampling was conducted in simple

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randomness. The data collected were entered into an electronic survey form using the Access® software version 2007. The data was analyzed on the SPSS 25.0 software. Each student's consent was obtained prior to their inclusion in the study and recalled prior to the start of the exam. The purpose of the study and all stages of the review were explained orally. The confidentiality of information, human rights, the rights to freedom of opinion, professional secrecy and privacy have been respected.

### 3. Results

The survey identified 120 students with a sex ratio of 0.84. The average age was 22 years.

Table 1 : Gender distribution

| Gender | Number | Percentage |
|--------|--------|------------|
| Male   | 55     | 45,8%      |
| Female | 65     | 54,2%      |
| Total  | 120    | 100%       |

Table 2 : Age distribution

| Age            | Number | Percentage |
|----------------|--------|------------|
| 18-23 yearsold | 80     | 66,6%      |
| 24-30 yearsold | 40     | 33,3%      |
| Total          | 120    | 100%       |

Table 3 : Distribution by gender and presence of sleepapnea(n=120)

| Gender | Number | Sleepapnea |
|--------|--------|------------|
|        |        | Percentage |
| Male   | 6      | 5%         |

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|        |    |       |
|--------|----|-------|
| Female | 8  | 6,6%  |
| Total  | 14 | 11,6% |

**Table 4 : Distribution by dental class (n=120)**

| Gender | Classe dentaire |            |            |
|--------|-----------------|------------|------------|
|        | Class I         | Class II   | Class III  |
| Male   | 25 (20,8%)      | 18 (15%)   | 12 (10%)   |
| Female | 32 (26,6%)      | 23 (19,1%) | 10 (8,3%)  |
| Total  | 57 (47,5%)      | 41 (34,1%) | 22 (18,3%) |

**Table 5 : Distribution by profile (n=120)**

| Gender | Profile     |            |
|--------|-------------|------------|
|        | Convex      | Concave    |
| Male   | 45 (37,5%)  | 10 (8,3%)  |
| Female | 56 (46,6%)  | 9 (7,5%)   |
| Total  | 101 (84,1%) | 19 (15,8%) |

#### 4. Discussion

Our study reports a higher percentage of students with sleep apnea in the female gender, while the literature states that the risk factors for the development of sleep apnea are: obesity, male gender, age, black race, alcohol and tobacco and male gender is considered a predisposing factor. The frequency of OSA is higher in men than in women [5].

The literature indicates that snoring increases with age and that it is exacerbated, among other things, by alcohol, smoking, sedatives, sleep deprivation [6]. A study carried out in Kinshasa in 2008

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reported a high percentage of subjects with obstructive sleep apnea syndrome in groups of subjects aged 25 to 35 years at 28.6% [7]. This differs in our study, with students aged 18 to 23 being more numerous at 66.6%. Nevertheless, Dayyat et al. proposed in 2007 a classification of OSA into three types [8]. Types 1 and 2 have in common the usual respiratory signs (snoring, restless sleep, labored breathing, mouth breathing, parent-described breathing stoppages, excessive sweating) and the possible existence of parasomnias (bedwetting, night terrors, and nightmares). In type 1, it is mainly young people who are not overweight, with marked adenoid hypertrophy and often with attention deficit hyperactivity disorders, whereas in type 2 the children are overweight with visceral and truncal obesity, an increased neck diameter, and less adenoid hypertrophy than in type 1. But on the other hand, excessive daytime sleepiness and psychological disorders (low self-esteem, depression, pathological shyness) are much more frequent, as well as cardiovascular and metabolic complications. Type 3 OSA occurs in subjects with neurological, malformative or genetic pathologies, with craniofacial malformations, neuromuscular or skeletal involvement (trisomy 21, Prader-Willi syndrome, Pierre-Robin syndrome, achondroplasia, craniostenosis) [9].

The prevalence of OSA was estimated at 3.23% [10], but our study reveals a prevalence of 11.6%.

The standard treatment is most often Continuous Positive Airway Pressure (CPAP), but also a Mandibular Advanced Orthosis, which have been reported by several authors including Rakotoson M et al in 2024 [11]. The Mandibular Advancement Orthosis can simultaneously treat a skeletal Class II, which constitutes 34.1% of our study population. The convex profile makes up the majority of our study population at 84.1%, which corroborates the study by Rakotoson M et al in 2023 [12,13].

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## 5. Conclusion

OSA is a serious and underdiagnosed condition in Madagascar. The observation of excessive daytime sleepiness should be feared because the declining intellectual level of students could have

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a relationshipwiththeirhiddenhealth situation. Dentofacial Orthopedics or Orthodonticsparticipates in the screening of thispathology in order to improve the health of the population in our country.

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