

ABSTRACT

Introduction: Professional musicians frequently report musculoskeletal issues arising from playing musical instruments, often from an early stage of professional training. The physical and psychological demands of playing a musical instrument at a professional level pose significant challenges to the musculoskeletal system. The complex and often repetitive tasks performed during practice and musical performances may increase the risk of overuse injuries, trauma, and associated health problems.

Objective: To evaluate the relationships between selected components and functions of the stomatognathic system, as well as the tension of specific masticatory and back muscles, with body posture characteristics and postural stability indices in saxophonists, compared to men not professionally or recreationally engaged in playing wind instruments.

Materials and Methods: The study involved 60 men aged 20-30 years, including 30 saxophone students randomly selected from Music Academies in Poland (study group, $=25.27\pm 2.88$ years) and 30 students randomly selected from Jagiellonian University in Kraków (control group, $=24.10\pm 2.50$ years). The average duration of saxophone playing in the study group was $=12.57\pm 2.06$ years. Examinations included assessments of the stomatognathic system (evaluation of temporomandibular joint pain, parafunctions, clicks, condylar mobility, jaw movement trajectories during opening, overbite, deviation, lateral shift to the right and left, passive ligament and capsule compression of the temporomandibular joint, traction and translation, palpation of the joint capsule, masticatory, cervical, suboccipital, and back muscles, occlusion assessment, malocclusion classification based on Angle's system, and bruxism). In the study group, muscle tension of selected masticatory and back muscles was evaluated both at rest and during activities taxing the stomatognathic system using a Noraxon electromyograph. Body posture was assessed using a DIERS device, and postural stability was examined using a Zebris FDM-S dynamographic platform. Statistical analysis utilized t-tests for independent variables, U-Mann Whitney tests, chi-square tests, repeated measures analysis of variance (Friedman ANOVA) with post-hoc Dunn tests, Pearson's linear correlation, or Spearman's rank correlation.

Results: Membership in the study group determined the frequency of temporomandibular joint pain ($p=0.001$), parafunctions ($p=0.014$), clicks within the temporomandibular joints

($p=0.020$), pain during traction and translation tests ($p=0.035$), pain during joint capsule palpation ($p=0.009$), muscle palpation pain ($p=0.004$), and bruxism symptoms ($p=0.005$). The study group showed a higher prevalence of Angle class IIb and III malocclusions, whereas the control group more often presented with class I or IIa ($p=0.002$). The study group exhibited lower ICT-ITL max kyphosis angle values ($p<0.001$), and a higher prevalence of reduced thoracic kyphosis ($p=0.049$).

Conclusions: Playing the saxophone predisposes individuals to abnormalities within the stomatognathic system, such as temporomandibular joint pain, parafunctions, clicks in the temporomandibular joints, pain during traction and translation tests, joint capsule and muscle palpation pain, and bruxism symptoms. Saxophone players exhibit less pronounced thoracic kyphosis and a higher prevalence of reduced thoracic kyphosis compared to non-wind instrument players. Individuals with temporomandibular joint clicks demonstrated higher kyphosis angle values, while those with bruxism symptoms exhibited lower kyphosis angle values. No causal mechanisms were identified between overbite, protrusion, deviation, lateral shift of the jaw, maximum amplitude of masseter muscle contractions, descending part of trapezius muscle activity, and stability indices.

Key words: body posture, postural stability, head position, temporomandibular joints, malocclusion, saxophone