Facial Muscle Activation Patterns Across Woodwind Instruments

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Introduction
Playing related pain among instrumentalists has the potential to influence performance. These concerns are exacerbated when a musician plays multiple instruments, including students pursuing advanced “multipurpose wind” degrees. It is important to identify nuanced environments and study methodologies that support multiple woodwind instrumentists as well as established performers. This study sought to examine multiple woodwind instrumentists in their performing environment by recording facial muscle activity patterns during musical tasks.

Unfortunately, little is known about the specific effects of playing multiple woodwind instruments. Because each instrument requires distinct embouchures and varying musculature demands, performing multiple woodwind instrumentists may require the use for muscular and injury. A primary objective of this study was to identify nuanced muscle activity patterns during musical tasks, as no similar studies have used DPG techniques to characterize nuanced muscle activity patterns during musical tasks.

Specific Aims
1. Compare and contrast muscle activity patterns across the five major woodwind instruments: bassoon, oboe, saxophone, clarinet, and flute.
2. Identify the most active muscle when performing specific woodwind instruments.
3. Compare the DPG measurements of each instrument across the five woodwind instruments.

Method
The participants were instructed to record their muscle activity while playing each instrument. The muscle activity was recorded using a custom instrument for each instrument. The DPG sensors were placed bilaterally on the masseter, temporalis, and zygomaticus muscles.

Results
Figure 1. Musical Excerpts Performed on Bassoon, Flute, Oboe, Saxophone, and Clarinet

Figure 2. Measurements of Muscle Locations

Figure 3. Comparison Graphs of Four Separate Muscles Across the Woodwind Instruments

Figure 4. Comparison Graphs of Activation Patterns of Four Muscles Within Each Woodwind Instrument

Conclusions
Measurable differences in muscle activation patterns across woodwind instruments, as well as across numerous studies investigating instrument-specific muscle activation patterns are shown in this study.bered discrepancies in instrument-specific muscle activity are evident, and further study is needed to determine the potential causes of such discrepancies.

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