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Ergonomic Evaluation Using OWAS: A Case Study of Dental Professional Posture

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ABSTRACT

The Ovako Working Posture Analysis System (OWAS) is an established ergonomic tool utilized to identify, classify, and evaluate working postures that contribute to musculoskeletal disorders (MSDs). This study analyzes the posture of a dental professional during patient treatment using OWAS methodology. By assigning posture codes to the back, arms, and legs, and determining load handling, the risk level of the observed posture was quantified. The analysis revealed a moderate ergonomic risk (Code 2311, Action Category 2), suggesting the need for corrective measures in the near future to reduce musculoskeletal strain. This research emphasizes the necessity of ergonomic interventions in dental practice to promote occupational health and efficiency.

Keywords: OWAS, Ergonomics, Dental Posture, Musculoskeletal Disorders, Occupational Health

INTRODUCTION

Dentistry is a profession that requires precision and often involves prolonged static postures, repetitive movements, and awkward working angles. These factors collectively increase the risk of work-related musculoskeletal disorders (WMSDs). The Ovako Working Posture Analysis System (OWAS), developed by Karhu *et al.* (1977), provides a structured framework for identifying and classifying postures that may pose ergonomic risks. OWAS categorizes back, arm, and leg positions, along with load handling, into specific codes that correspond to risk levels and necessary corrective actions. The system is practical and widely adopted in occupational health assessments.

Review of Literature:

Karhu *et al.* (1977) introduced OWAS as a systematic approach for posture classification and risk assessment in industrial settings. Subsequent studies have validated its application across sectors such as healthcare, agriculture, and manufacturing (Kee and Karwowski, 2007). Valachi and Valachi (2003) emphasized that dentists are among the most affected healthcare professionals, with nearly 65–70% reporting musculoskeletal discomfort due to prolonged forward bending and poor posture maintenance. Punnett and Wegman (2004) further noted that ergonomic interventions can significantly reduce these occupational risks by modifying workplace design and posture awareness.

METHODOLOGY

Type of Study

Observational study -on the basis of OWAS score code .

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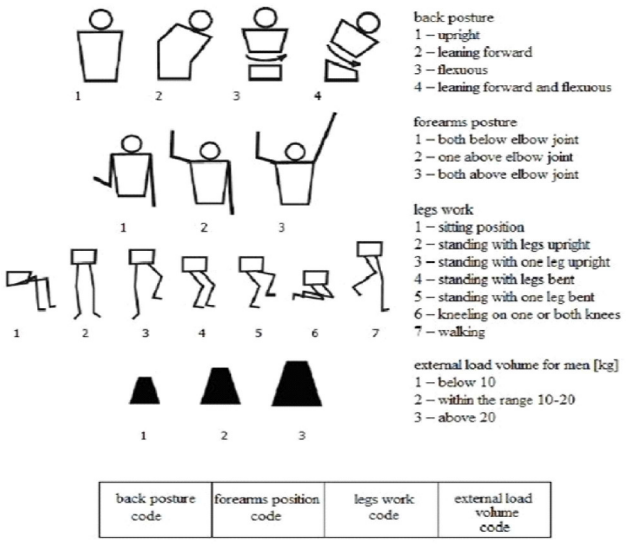

Fig. 1 : Ovako working posture assessment system

Procedure:

Fig. 2 : Cavity preparation and restoration for caries removal

This study utilized a static image of a dental professional performing a clinical procedure. The OWAS method was applied by visually coding the posture of the individual based on four main parameters: back, arms, legs, and load handling. Each parameter was assigned a numerical value according to the OWAS posture classification table, leading to the formation of a four-digit code representing the overall posture risk level.

The OWAS procedure followed in this analysis comprised the following steps:

1. Observation of the dental professional's working posture using the provided image.
2. Coding of body segments as per OWAS categories:
   - Back: 2 – Bent forward posture
   - Arms: 3 – Both arms raised above shoulder level
   - Legs: 1 – Sitting posture
   - Load: 1 – Load handled less than 10 kg
3. The combined code was determined as 2311.
4. The OWAS code was interpreted using the OWAS Action Categories to determine the urgency of corrective action.

Risk Category	Effect of the Posture	Required Action
1	Normal and natural posture without harmful effects on the musculoskeletal system.	No action required.
2	Posture with the possibility of causing harm to the musculoskeletal system.	Corrective actions required in the near future.
3	Posture with harmful effects on the musculoskeletal system.	Corrective actions required as soon as possible.
4	The load caused by this posture has extremely harmful effects on the musculoskeletal system.	Immediate corrective actions required.

RESULTS AND DISCUSSION

The OWAS posture code 2311 corresponds to Action Category 2, which indicates that the posture requires corrective action in the near future. The bent back and elevated arms increase the risk of strain in the cervical and lumbar spine. Although the dentist is seated and handling minimal load, repetitive exposure to such postures can contribute to chronic musculoskeletal disorders if not addressed promptly.

The findings align with the growing evidence that dentists are at moderate to high ergonomic risk due to sustained awkward postures. Implementing ergonomic interventions such as proper seating, patient chair height adjustment, use of magnification loupes, and periodic rest breaks can minimize physical strain. Training in posture correction and ergonomic principles should be integrated into dental education and practice to enhance occupational

health.

Conclusion:

The OWAS-based ergonomic evaluation of the dental professional revealed a moderate risk level posture requiring corrective measures in the near future. By adopting ergonomically optimized postures, redesigning dental equipment, and promoting awareness among practitioners, the incidence of WMSDs can be substantially reduced, improving overall health and productivity in dental practice.

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