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The effects of an innovative wearable technology for posture correction

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Purpose: To determine the effects of a new wearable tech garment on the scapular alignment and sEMG of scapula and lumbar muscles.

Methods: A random sample of twenty individuals, 11 women and 9 men, was tested (n =20) and a homogenous variance between individual measurements was assumed. Each individual was asked to stand in the resting position while his/her scapula alignment was evaluated using the Lennie Test (3). Age and gender of each participant was recorded, as well as their status as an athlete. Individuals who spent more than 4 days per week in the gym for over 30 minutes were categorized as recreational athletes. A wearable technology integrated in a polycotton fabric light weight crew shirt was used for testing. Before the application of the smart apparel, an electromyograph was used to record muscle activation data of the middle trapezius and lower erector spinae. Patients were asked to stand comfortably and breathe normally. All EMG measurements used three electrodes, one for the middle muscle, one for the end of the muscle, and one reference electrode placed on unaffected muscle groups. EMG measurements were taken in 20 second intervals and transmitted over Bluetooth to be saved on a separate device. After the application of the shirt, an EMG was taken again using the same electrode positions.

Results: After performing a two-sample t-test, it was determined that the effect of the smart wear on resting scapular position, was statistically significant ($p<0.5$). Using a 95% confidence interval, individuals who obtained a scapular positioning difference of between 6.64mm and 21.2mm. In addition, EMG data proved a statistically significant result that the mean frequency and mean voltage were lower in the mid trapezius after the application of the posturepedic shirt. EMG data also proved a statistically significant result that the mean frequency and mean voltage were higher in the erector spinae after the application of the posturepedic shirt.

Conclusion: Application of the innovative smart wear in workplace improves shoulder rounding by retracting the scapula, open the chest, and bringing the resting scapular distance closer to each other. The EMG data further support our hypothesis that by bringing the scapula's closer together, the middle trapezius muscle shows less activity with less activation of sEMG, and the lumbar muscle has more muscle activation to provide better support. The study also revealed that there is no statistical significance of either age or gender on the effectiveness of the shirt however, recreational athletes did show increased scapular retraction compared to non-athletes. The application of a light smart wear in workplace can improve ergonomics and reduce occupational hazards in many healthcare professional workplaces.

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