

Bilateral differences at shoulder structures in asymptomatic competitive swimmers during training season

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Summary

This study examined shoulder structure differences in asymptomatic boy and girl swimmers over a season. Ultrasound measured deltoid muscle thickness (DMT), supraspinatus tendon thickness (STT), acromiohumeral distance (AHD), and humeral head cartilage thickness (HCT) during preseason, midseason, and postseason. AHD showed a bilateral difference in girls during the postseason ($p=0.008$), while DMT, STT, and HCT remained similar on both sides in both genders. No shoulder periarticular asymmetry was observed throughout the season.

Introduction

Although swimming involves symmetrical motor patterns, factors like asymmetrical loading, breathing technique, and head positioning can cause differences in shoulder structures throughout the season [1-2]. There are no studies revealing the changes in these side-to-side differences throughout the season. Therefore, this study aims to examine these differences in asymptomatic boy and girl swimmers.

Methods

Twenty-five professional young swimmers (13 girl, 12 boy), aged 10-12 participated in this study, following their routine training programs throughout the season. The swimmer training program includes swimming training 6 days a week (10 hours in total), and 3 dry-land training (3 hours in total) including a general strengthening/stretching program for the upper/lower limbs. Bilateral STT, HCT, DMT and AHD were assessed in in three periods as preseason, midseason, and postseason by a physiatrist with over four years of experience in musculoskeletal ultrasound. The percentage of the difference between the right and left limbs was calculated with the formula $(\text{right side-left side})/\text{right} \times 100$. Side-to-side measurements were analyzed with paired t-tests for both genders. The percent change of shoulder structures (differences between left and right side) for each period were analyzed by repeated measure ANOVA. Significance levels were set at $p<0.05$.

Results and Discussion

Anthropometric characteristics were similar between girls and boys. The swimming branches of the 25 swimmers were 8 freestyle, 7 breaststroke, 5 butterfly and 5 backstroke. While

no side-to-side differences were found in DMT, STT, and HCT at pre-season, mid-season, and post-season in both genders; bilateral differences were found in the AHD measurement at the post-season in girls ($p=0.008$). Additionally, no difference between periods in percent change in DMT, STT, HCT, and AHD was found (Figure 1) in all swimmers. In more detail, while the percent change in STT decreased from pre-season to mid-season, it increased from mid-season to post-season. However, the change was not statistically significant. Although the percent change in AHD decreased throughout the season, there was no statistical difference.

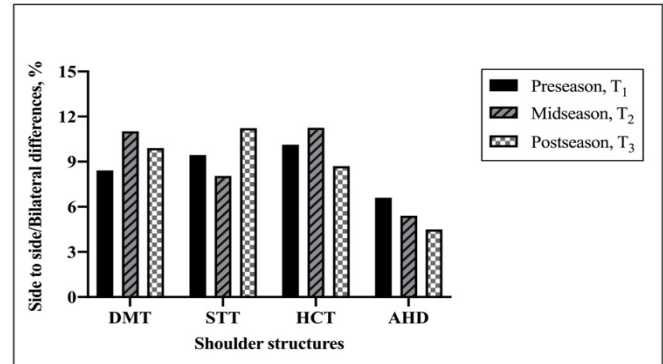


Figure 1. Between periods in percent change in shoulder structures.

Conclusions

No asymmetry in the shoulder periarticular structures was observed in both boy and girl swimmers during a competitive season. The swimmers' bilateral breathing pattern and low swimming age may have played a role in maintaining symmetry. Although one season of swimming training maintains a symmetry in this young population of low age and experience, it is unclear whether differences are seen in swimmers of older athletic age. Therefore, studies with longer follow-ups and with swimmers of older sports age are needed.

References

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