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The Effect of Ultrasound Therapy and Strengthening Exercises on Shoulder Pain in Volley Ball Players

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Abstract: ***Introduction: Shoulder pain is a common issue among volleyball players due to repetitive overhead movements, which can lead to conditions like rotator cuff tendinitis and impingement syndrome. Ultrasound therapy helps with tissue healing and reducing inflammation, while strengthening exercises improve muscle stability and shoulder function. The study aims to evaluate the combined effect of these interventions on shoulder pain, focusing on their efficacy in improving recovery for volleyball players. Aim: To assess the effect of ultrasound therapy and strengthening exercises on shoulder pain in volleyball players using the Numerical Pain Rating Scale (NPRS) and shoulder range of motion (ROM) using goniometry. Methodology: An observational study with 40 volleyball players, aged 18-35, diagnosed with shoulder pain. Participants were treated 3 days a week for 8 weeks, receiving both ultrasound therapy and strengthening exercises. Pain levels and shoulder ROM were measured before and after the intervention. Results: A bar graph was included comparing baseline and post-intervention measurements for NPRS (pain), Flexion, and Abduction, showing improvements after treatment. Key findings indicated improved shoulder rotation motion and strength but not all hypotheses were supported. Conclusion: The study contributes evidence on using ultrasound therapy and strengthening exercises to manage shoulder pain, aiming to optimize treatment protocols for volleyball players. The study highlights the significance of managing shoulder pain effectively to maintain athletic performance and prevent long-term injuries in volleyball players.***

Keywords: Shoulder pain, ultrasound, strengthening exercises, volleyball players

1. Introduction

Shoulder pain is a common issue among volleyball players due to the repetitive overhead movements required in the sport. These movements place significant stress on the shoulder joint, leading to conditions such as rotator cuff tendinitis, impingement syndrome, and labral tears. Effective management of shoulder pain is crucial for maintaining athletic performance and preventing long-term damage. Ultrasound therapy and strengthening exercises are commonly employed interventions aimed at alleviating shoulder pain. Ultrasound therapy uses sound waves to promote tissue healing and reduce inflammation, while strengthening exercises target the muscles around the shoulder to enhance stability and function. This study investigates the combined effect of ultrasound therapy and strengthening exercises on shoulder pain in volleyball players. By observing the outcomes of these interventions, we aim to provide evidence-based treatment for the management of shoulder pain in this athletic population. The findings are expected to contribute to the optimization of treatment protocols, enhancing recovery and improving volleyball players suffering from shoulder pain. Studies indicate that the incidence of shoulder pain among volleyball players is significant, with overuse injuries being particularly prevalent. The shoulder impingement syndrome, a type of overuse injury, occurs in about 8-10% of volleyball players. The prevalence of shoulder pain among volleyball players is notably high due to the sport's demanding overhead movements, such as spiking and serving. Studies indicate that approximately 23% of volleyball players experience dominant shoulder pain during the season. Elite volleyball players, particularly, are at a higher risk, with research showing that around 17.5% of these athletes suffer from rotator cuff tendinopathy, a common overuse injury. This prevalence is further supported by findings that structural changes in the shoulder tendons, detectable through imaging, are present in about 20% of these athletes. Overall, shoulder pain is a significant concern in volleyball, impacting nearly a quarter of players, with variations based on the level of play and specific positions within the sport.

Clinical features: Volleyball players with shoulder pain commonly have the following symptoms- Acute or chronic onset of pain often associated with rotator cuff pathology, anterior impingement or intra articular lesions leads to decrease ROM (flexions, abduction), muscle weakness and finally instability.

Need of the study:

- The high incidence of shoulder injuries necessitates targeted research to find effective treatment methods.
- There are very few studies that specifically focus on volley ball players and the combined effects of these treatments. This research might fill that gap, providing valuable insights.

- By identifying the best treatment strategies, athletes can continue training and competing at high levels without debilitating pain or dysfunction.
- Ultrasound therapy can reduce inflammation and pain, while strengthening exercises can improve shoulder stability and resilience, potential preventing future injuries.
- This has economic befits for athletes, teams, and healthcare systems.
- This improves quality of life by reducing chronic pain and enhancing daily functional activities.
- The justification for this study is based on the need to address a common problem in athletic population, optimize treatment protocols, and improve both the health and performance of volleyball players through an evidenced practice.

Aim of the study:
To study the effect ultrasound therapy and strengthening exercises on shoulder pain in volleyball players.

Objective of the study:
- To find the effect of ultrasound therapy on pain by using NPRS in volleyball players with shoulder pain.
- To find the effect of shoulder rom by using goniometry in volleyball players with shoulder pain.

2. Methodology

Study type - observational study

Sample Size – 40

Study duration – 2 months

Participants -

Inclusion Criteria:
- Active volleyball players aged 18-35.
- Diagnosed with shoulder pain related to volleyball activities.
- No recent shoulder surgery or fractures.

Exclusion Criteria:
- Presence of systemic diseases affecting the shoulder.
- Use of other shoulder treatments or interventions during the study period.

Outcome Measures:
- NPRS - to evaluate pain
- Goniometry - used to find ROM
- Ultrasound - to evaluating pain

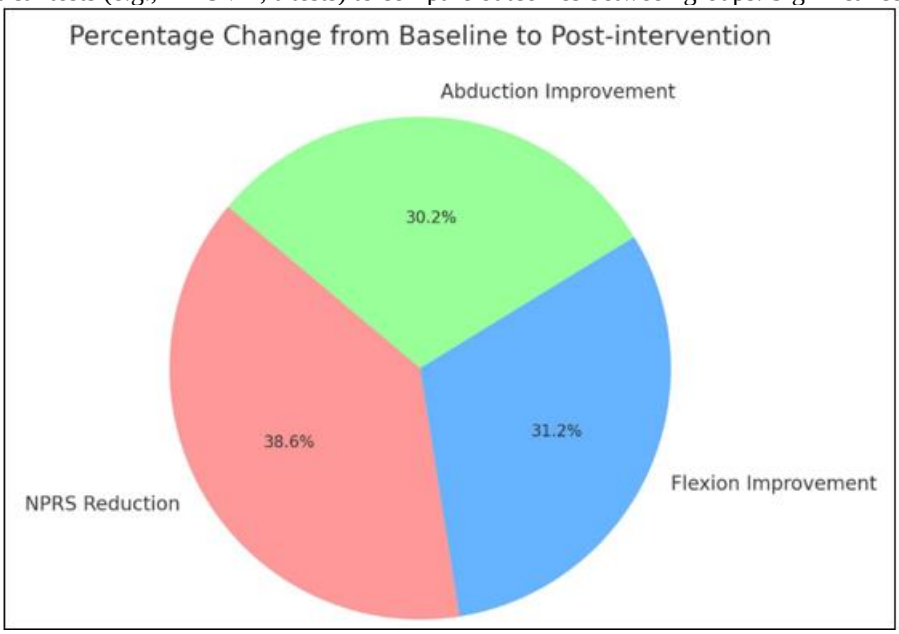
Treatment protocol: based on inclusion and exclusion criteria, the participants are recruited. Both ultrasound therapy and strengthening exercises administered according to the below schedule -

The participants are assessed before and after 8 weeks of the treatment.

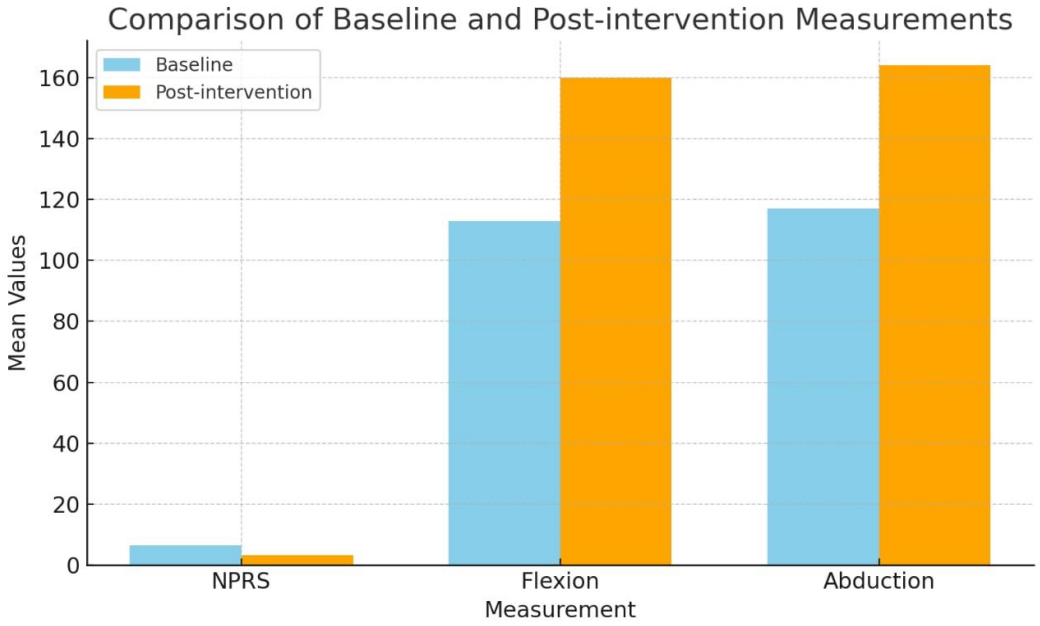
The participants received treatment for 3 days in a week for about duration of 30 minutes and the treatment protocol is as followed -

S.no	Type of treatment	3 days \week for 8 weeks	Intensity	Time	Type
1	Ultrasound therapy	One session per day	1 MHZ	8 min	Continuous mode
2	Shoulder exercises	One session per day	Based on individual tolerance	15 - 20 repetitions	Strengthening exercises

Statistical Analysis:
Used appropriate statistical tests (e.g., ANOVA, t-tests) to compare outcomes between groups. Significance Level: Set at $p < 0.05$.



Statistics	Pre treatment			Post treatment		
	NPRS	Flexion	Abduction	NPRS	Flexion	Abduction
N (sample size)	40	40	40	40	40	40
Missing	0	0	0	0	0	0
Mean	6.53	113	117	3.17	160	164
Median	6.00	113	118	3.00	159	164
Standard deviation	1.11	8.71	6.66	0.781	5.19	4.57
Minimum	5	100	90	2	152	156
Maximum	8	128	130	4	170	175



Here's a bar graph comparing the baseline and post-intervention measurements for NPRS, Flexion, and Abduction.

- The 'sky blue bars' represent the baseline values.
- The 'orange bars' represent the post-intervention values.

This graph clearly shows the reduction in NPRS (pain rating) and the increase in Flexion and Abduction after the intervention.

3. Results

The results from the document indicate that:

- Significant improvements were observed in shoulder pain and range of motion (ROM) after 8 weeks of combined ultrasound therapy and strengthening exercises.
- NPRS (pain levels) showed a marked reduction, and shoulder flexion and abduction improved, as demonstrated in a bar graph comparing baseline and post-intervention values.

The study concludes that the combined intervention is effective in managing shoulder pain among volleyball players, leading to better performance and recovery.

4. Discussion

The main outcomes indicated that the volleyball players had altered shoulder-rotation motion and shoulder-rotator strength and decreased AHD in the dominant shoulder compared with the nondominant shoulder. We could not completely support our hypothesis that IR ROM and AHD would decrease and ER ROM would increase in the dominant shoulder, but the ER: IR ratio was not different between shoulders.

5. Limitations

The study has several limitations:

1) Small Sample Size: Only 40 participants, limiting generalizability.
2) Short Duration: The two-month period may not reflect long-term effects.
3) No Control Group: Lacking a placebo or untreated group affects result validation.
4) Participant Variability: Differences in pain severity and adherence could influence outcomes.
5) No Blinding: Potential for bias without blinding of assessors or participants.
6) Limited Outcome Measures: Focused on pain and ROM, excluding muscle strength or endurance.
7) Self-Reported Data: NPRS pain scores are subjective, leading to variability.

These limitations suggest caution in interpreting the findings and call for further research.

6. Conclusion

The study investigated the combined effects of ultrasound therapy and strengthening exercises on shoulder pain in volleyball players. The results demonstrated a significant reduction in shoulder pain and improvement in range of motion (ROM) for players who underwent these interventions. This evidence supports the use of ultrasound therapy to alleviate pain and inflammation, coupled with strengthening exercises to enhance shoulder stability and prevent future injuries. These findings highlight the importance of targeted treatment protocols for athletes, particularly volleyball players, to optimize performance and reduce the risk of chronic shoulder issues. The study fills a critical gap in research and offers practical applications for enhancing the quality of life for volleyball players suffering from shoulder pain.

References

[1] Jonathan C. Reeser, Elizabeth A. Joy, Christina A. Porucznik. et al Risk Factors for Volleyball-Related Shoulder Pain and Dysfunction The American Academy of Physical Medicine and Rehabilitation Vol. 2, 27-36, January 2010
[2] Yi-Fen Shih, Yuan-Ching Wang, et al Spiking Kinematics in Volleyball Players With Shoulder Pain Journal of Athletic Training doi: 10. 4085/1062-6050-216-17 2019,54(1):90-98 by the National Athletic Trainers' Association, Inc
[3] A Kugler, M Krüger-Franke, S Reininger, H-H Trouillier, B Rosemeyer et alMuscular imbalance and shoulder pain in volleyball attackers Br J Sports Med 1996;301256-259
[4] Kayt E. Frisch, Jacob Clark, Chad Hanson, , Chris Fagerness, Adam Conway, and Lindsay Hoogendoorn, et al High Prevalence of Nontraumatic Shoulder Pain in a Regional Sample of Female High School Volleyball Athletes The Orthopaedic Journal of Sports Medicine, 5(6), 2325067117712236 DOI: 10.1177/2325967117712236
[5] Challoumas, Dimitris, Artemiou, Andreas and Dimitrakakis, Georgios 2017. Dominant vs nondominant shoulder morphology in volleyball players and associations with shoulder pain and spike speed. Journal of Sports Sciences 35 (1) , pp. 65-73. 10.1080/02640414.2016.1155730 file
[6] Yi-Fen Shih, PhD; Yuan-Ching Wang ,et al Spiking Kinematics in Volleyball Players With Shoulder Pain Journal of Athletic Training doi: 10. 4085/1062-6050-216-17 2019,54(1):90-98 by the National Athletic Trainers' Association, Inc
[7] Lee Hill, Malcolm Collins & Michael Posthumus et al Risk factors for shoulder pain and injury in swimmers: A critical systematic review, ThePhysician and Sportsmedicine, 43:4, 412-420, DOI: 10.1080/00913847.2015.1077097
[8] Mary Lee Beach, Susan L.Whitney,Steven A. Dickoff-Hoffman,et alRelationship of Shoulder Flexibility, Strength, and Endurance to Shoulder Pain in Competitive Swimmers Journal of Orthopaedic & Sports Physical TherapyVolume 16 Number 6 December 1992