

The Affect of Sex on Healing Rates of Sports Shoulder Injuries in Individuals Aged 13-19

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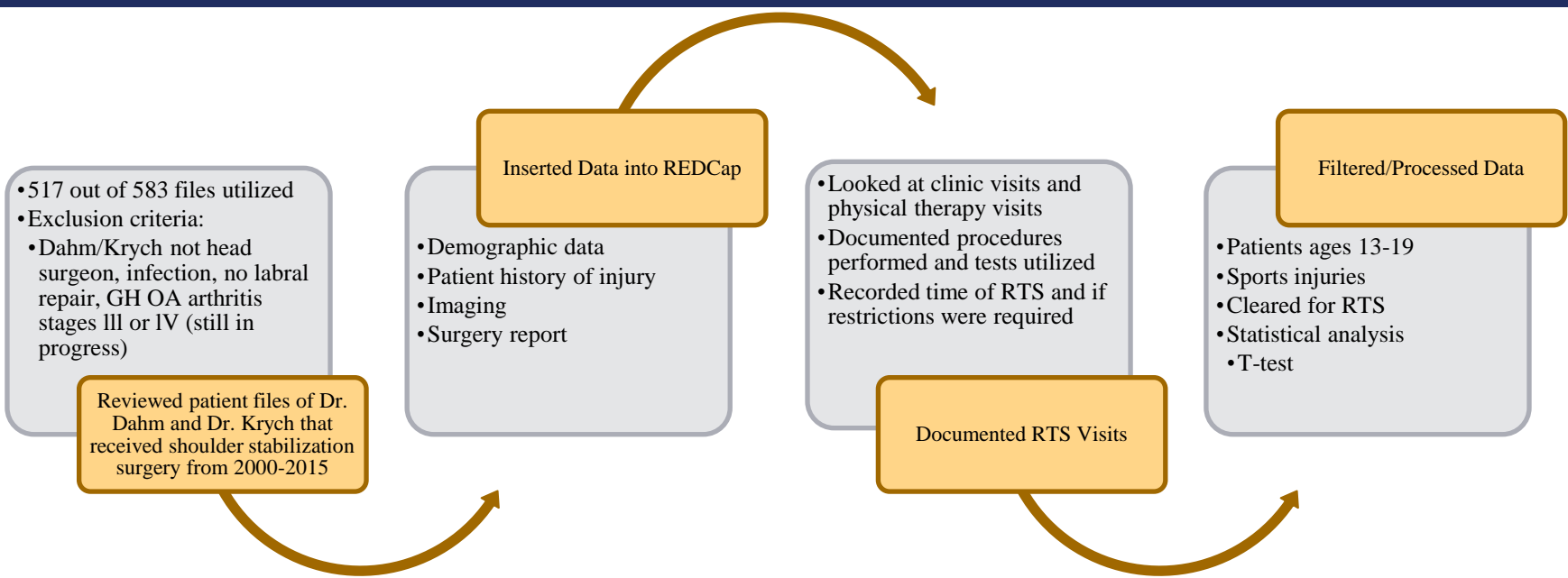
Background	Objectives	Hypothesis	Results	Discussion
<p>Factors that affect the rate of wound healing:^{1,2}</p> <ul style="list-style-type: none"> Local- <ul style="list-style-type: none"> oxygenation venous sufficiency Systemic – <ul style="list-style-type: none"> sex hormones disease (diabetes, fibrosis, jaundice, etc.) alcohol/smoking <p>Women have a lower peak oxygen intake³</p> <ul style="list-style-type: none"> smaller lung volume less alveolar surface area higher respiratory resistance <p>Estrogen⁴</p> <ul style="list-style-type: none"> increases skin hydration thickens the epidermis improves barrier functions prevents collagen loss sex hormone found in both sexes 	<p>To determine if there is a difference in musculoskeletal healing rates between males and females that could potentially be attributed to the physiological differences between the sexes.</p>	<p>Men have faster healing rates related to sports injuries of the shoulder hat cause labral tears, among other injuries to the shoulder joint, than women.</p>	<ul style="list-style-type: none"> Experiment conducted at a 95% confidence interval No significant difference in healing rates between teenagers of different sexes (p=0.25) Average RTS males: 6.59 <ul style="list-style-type: none"> Standard Error: 0.17 Males: 128 Average RTS females: 6.00 <ul style="list-style-type: none"> Standard Error: 0.49 Females: 16 	<p>Male and female adolescents tend to heal at similar rates when recovering from a shoulder stabilization surgery following a sports injury</p> <p>Findings contradict current literature stating that higher estrogen levels in women cause slower healing⁵</p> <p>Males had a larger distribution of healing patterns than females in this study</p> <p>Limitations: small number of female subjects; different injuries among athletes</p>
<p>Methods</p> 				
<p>Conclusions</p> <p>There is no difference in healing rates between males and females in teenagers that have undergone a labral repair, with potential other surgical intervention, for shoulder stabilization after a sports injury.</p>				

Table 1: Age Distribution by Sex

	13	14	15	16	17	18	19
Males	-	3	14	23	39	34	15
Females	-	2	2	6	2	1	3

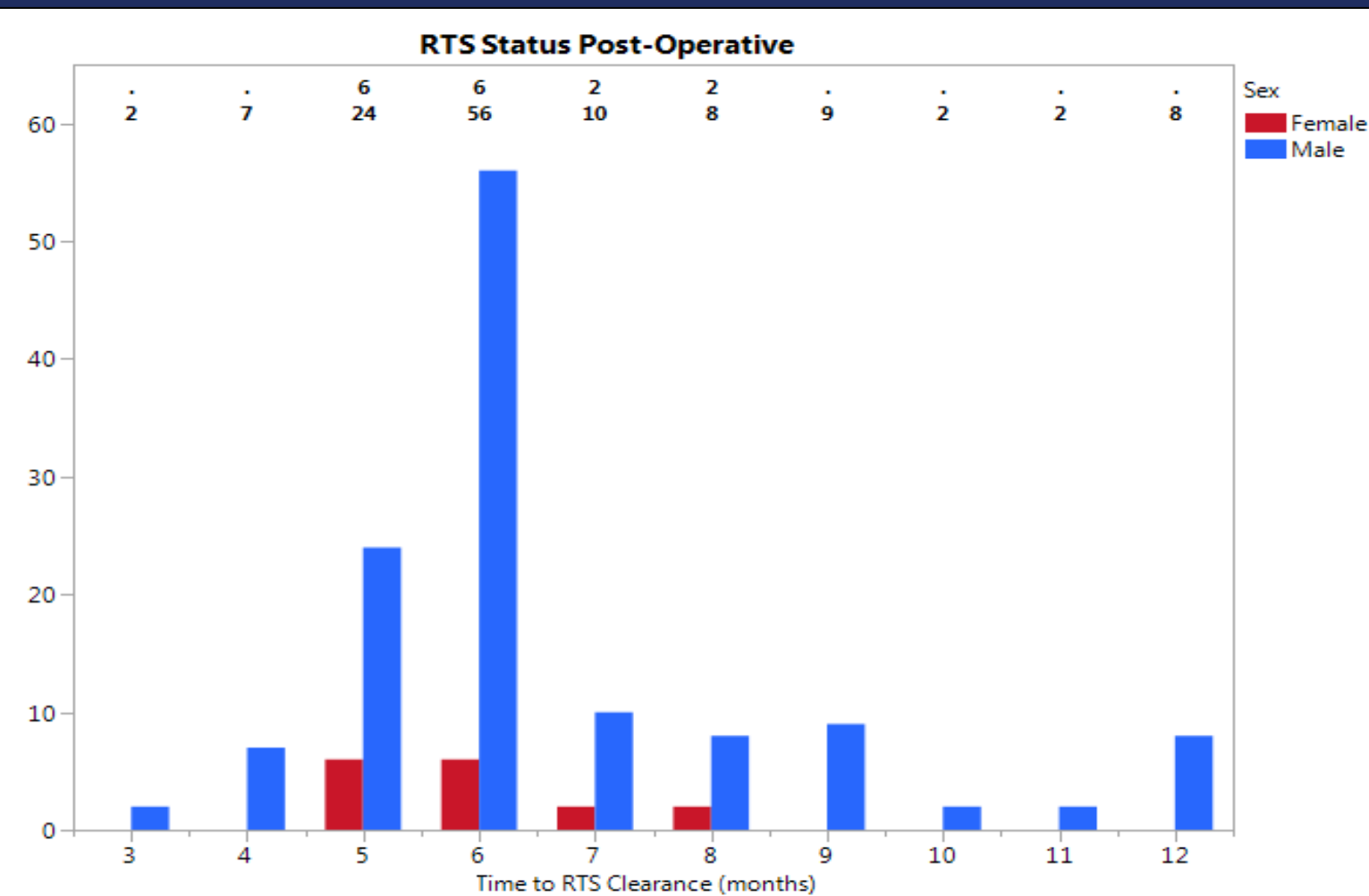
Table 1: Shows the number of individuals in each age grouping by sex

Table 2: RTS Distribution by Sex

	3	4	5	6	7	8	9	10	11	12
Males	1.6	5.5	18.8	43.8	7.8	6.3	7.0	1.6	1.6	6.3
Females	-	-	37.5	37.5	12.5	12.5	-	-	-	-

Table 2: Shows the percentage of total athletes healed by sex for each month post-operative

Figure 1



References

¹Guo, S., & DiPietro, L. A. (2010). Factors Affecting Wound Healing. *Journal of Dental Research*, 89(3), 219-229. doi:10.1177/0022034509359125

²LoMauro, A., & Aliverti, A. (2018). Sex Differences in Respiratory Function. *Breathe*, 14(2), 131-140. doi:10.1183/20734735.000318

³Reybrouck, T., & Fagard, R. (1999). Gender Differences in the Oxygen Transport System During Maximal Exercise in Hypertensive Subjects. *Chest*, 115(3), 788-792. doi:10.1378/chest.115.3.788

⁴Oh, D. M., & Phillips, T. J. (2006). Sex Hormones and Wound Healing. *Wounds*, 18(1), 8-18. Retrieved from <https://www.woundsresearch.com>

⁵Federation of American Societies for Experimental Biology. (2012, April 2). Estrogen is responsible for slow wound healing in women, study finds. Retrieved from www.sciencedaily.com