INITIAL RESEARCH ON THE BIOMECHANICAL FEATURES OF THE TRIANGLE FIBROCARTILAGE IN HUMAN WRIST

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INTRODUCTION: Fibrocartilage in the wrist joint is a structure common to both distal radioulnar and wrist joint. It works to cache direct pressure between head of ulna and wrist bones and to disperse the load. The structure is susceptive to acute and chronic strain due to the stretch, pressure and shearing during movement. It is significant for further research on physiological function and injury mechanism of the fibrocartilage to obtain the biomechanical parameters and the relevant constitutive equation of it.

METHODS: Sixty pieces of fresh fibrocartilages are conducted on stress relaxation experiments at various strain levels and stretch experiments at equal strain speed. Experimental results are analyzed using the virtual linear viscous theory.

RESULTS: 1. The level of research on stress relaxation is low in the fibrocartilage, and the initial ratio of the stress relaxation is between 8% and 15%. 2. The constitutive equation is:

For the wrist bone surface: $\sigma^e(\varepsilon) = 1.111(e^{1.923\varepsilon} - 1)$

For the ulna bone surface: $\sigma^e(\varepsilon) = 1.111(e^{2.904\varepsilon} - 1)$

3. The difference of the mechanical features between the wrist bone surface and the ulna bone surface is small.

DISCUSSION: The obsolete difference of mechanical features between the two surfaces indicates that they are similar in different areas and they are not the reason for injury.

CONCLUSIONS: The acute and chronic strain is not quite related to location of the fibrocartilage but more related to the striking angle, joint movement margin and muscle working properties.

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