بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / هناء محمد علي

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: ....

Effect of Platelet Rich Plasma Therapy for Shoulder Osteoarthritis: Double Blinded Randomized Controlled Study

A Thesis

For Partial Fulfillment of Master Degree
in **Pain Management**

By

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2021 - 2022

سورة البقرة الآية: ٣٢

Acknowledgments

*First of all, thanks to **Allah**, most merciful and compassionate. Without the help of **Allah**, nothing could be done.*

*I would like to express my sincere gratitude and deep appreciation to **Prof. Amr Mohammed Abd Elfatah,** Professor of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for his continuous scientific guidance. Words cannot adequately express my great thanks and gratitude to him.*

*I am delighted to express my deep gratitude and sincere thanks to **Prof. Mohamed Osman Taeimah,** Lecturer of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for his great help, endless support and kind supervision throughout the period of work.*

*I am greatly indebted to, **Dr. Marwa Mostafa Hasan,** Lecturer of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for her continuous interest, helpful cooperation and effective advice throughout the entire work. She guided me patiently, provided me generously with her valuable experience, which kept me on the right way.*

Mohammed Salah Abd Allah Ismael

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List of abbreviations

AAOS	American Academy of Orthopaedic Surgeons
FGF	Fibroblast GF
GFs	Growth factors
IGHL	Inferior glenohumeral ligament
MGHL	Middle glenohumeral ligament
NSAIDs	Non-Steroidal Anti-Inflammatory Drugs
OA	Osteoarthritis
PRF	Platelet-rich fibrin
PRP	Platelet rich plasma
SASD	Subacromial–subdeltoid
SC	Subscapularis
SCJ	Sternoclavicular joint
SER	Strength in external rotation
SGHL	Superior glenohumeral ligament
SST	Simple shoulder test
UCLA	University of California

Introduction

Osteoarthritis of the shoulder is the consequence of the destruction of the articular surface of the humeral head and glenoid and results in pain and loss of function. It can be primary or secondary [(1)]. The prevalence of women appears to be more susceptible than men and the shoulder osteoarthritis increases with age [(2)].

Primary osteoarthritis is diagnosed when no predisposing factors that could lead to joint malfunction are present. Secondary osteoarthritis may occur as a result of chronic dislocations and recurrent instability, trauma, surgery, avascular necrosis, inflammatory arthropathy, and massive rotator cuff tears [(3)].

Treatment of shoulder osteoarthritis is often controversial and is typically based on the patient's age, the severity of symptoms, and level of activity, radiographic findings, and medical comorbidities. Nonoperative treatment options include activity modification, physical therapy, anti-inflammatory drugs, non-Steroidal Anti-Inflammatory Drugs (NSAIDs), and intra-articular injections. If conservative options fail, surgical treatment should be considered. Although different surgical procedures are available, as in other joints affected by severe osteoarthritis, the most effective treatment is joint arthroplasty [(4)].

Platelet-rich plasma (PRP) is an autologous concentration of human platelets in a small volume of plasma, where the platelet concentration is higher (typically up to five times higher) than the normal platelet concentration in a healthy person’s blood. PRP is used in intervention giving evidence that it has a potential regenerative effect on certain body tissues, in addition to the main role platelets play in hemostasis [(5)].

Aim of the Work

This study aims to evaluate the efficacy of platelet-rich plasma as a treatment for primary and secondary shoulder osteoarthritis pain.

Review of Literature

Anatomy of the shoulder joint

The shoulder joint is one of the most complicated joints in the body. The glenohumeral joint is a ball-and-socket type of synovial joint where humeral head articulates with the glenoid cavity of the scapula. The articular surface of the humeral head is larger as compared to the glenoid fossa which is a primary cause of instability in this joint [(6)].

❖ Articular anatomy of the shoulder joint

The most flexible joint in the entire human body is the shoulder joint; this is due to a synergistic action of four separate articulations: the glenohumeral, acromioclavicular, sternoclavicular and scapulothoracic joints [(7)].

- **Glenohumeral Joint:**

The glenohumeral joint consists of an articulation between the scapula and humerus. It is the multi-axial ball and socket synovial joint formed by the articular surfaces of the glenoid cavity and the head of the humerus. The humeral head lies within the glenoid fossa, a cavity that is lined by the glenoid labrum. The shallow nature of the glenoid fossa lends the glenohumeral joint an increased range of motion while providing little stability. The osseous structures are surrounded by the glenohumeral capsule, a fibrous network attached medially to the margin of the glenoid cavity and laterally to the anatomic neck of the humerus [(8)]. (Figure 1)

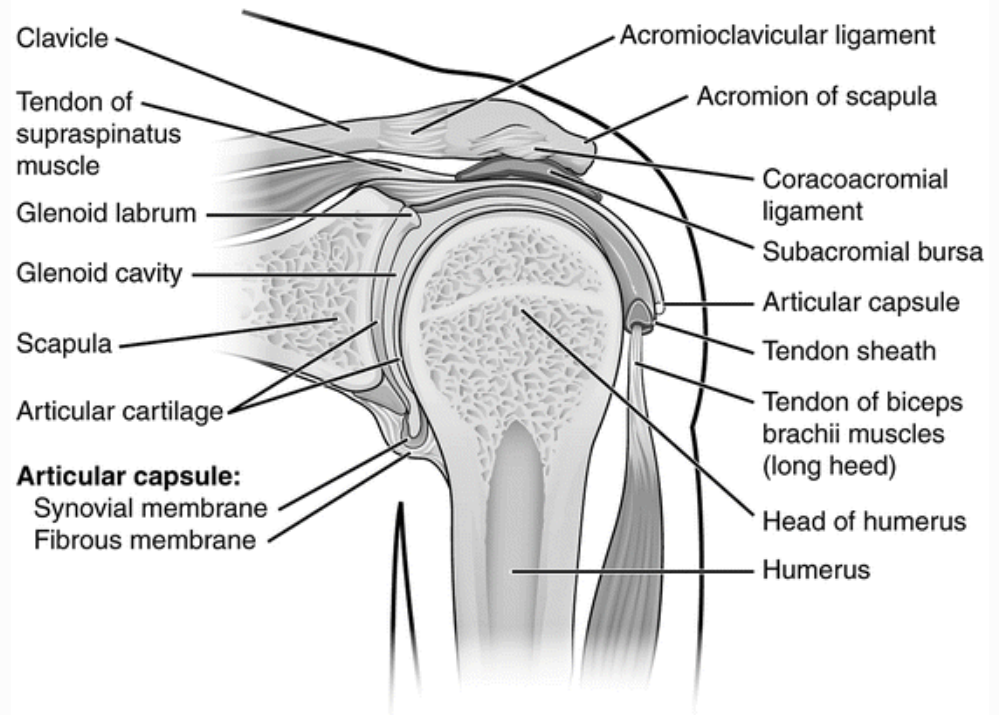

Figure (1): Coronal section through right glenohumeral joint (posterior view) [(9)].

- ## Acromioclavicular Joint

The AC joint connects the lateral aspect of the clavicle to the acromion. It is a diarthrodial joint with a fibrocartilaginous disk and hyaline articular cartilage, which with age is gradually replaced by fibrocartilage [(10)].

- ## Sternoclavicular joint:

The sternoclavicular joint (SCJ) is the only true joint joining the upper limbs to the axial skeleton. It is also the least constricted joint in the human body, and its stability depends mainly on ligament structures [(11)].

- ## The scapula-thoracic gliding mechanism:

It is not a true joint but is the riding of the concave anterior surface of the scapula along the convex posterolateral surface of the thoracic cage (ribs 2–7). The thorax and scapula are separated by the subscapularis and serratus

anterior muscles, which glide over each other during movements of the scapula. The scapula is held in close approximation to the chest wall by muscular attachments. In movements of the shoulder complex, the scapula can be protracted, retracted, elevated, depressed, and rotated about a variable axis perpendicular to its flat surface. However, fibrous adhesions can sometimes occur following a shoulder injury, particularly if the joint has been immobilized for a long period of time [(9)].

❖ Anatomy of soft tissue structures of the shoulder joint

- **Glenoid Labrum**

The glenoid labrum is a fibrous and fibrocartilaginous structure that rims the glenoid and circularly covers the glenoid cavity (**Error! Reference source not found.**). The morphology of the labrum and capsule is distinctly different in its superior and inferior regions. They found that the inferior part of the labrum and capsule was usually a round, elevated, fibrous structure firmly attached to the glenoid. In contrast, the superior part of the labrum and capsule tended to be meniscal in appearance and more loosely attached to the glenoid and mobile. The superior part of the labrum and capsule may constitute a mobile extension of the contour of the glenoid surface [(12)].

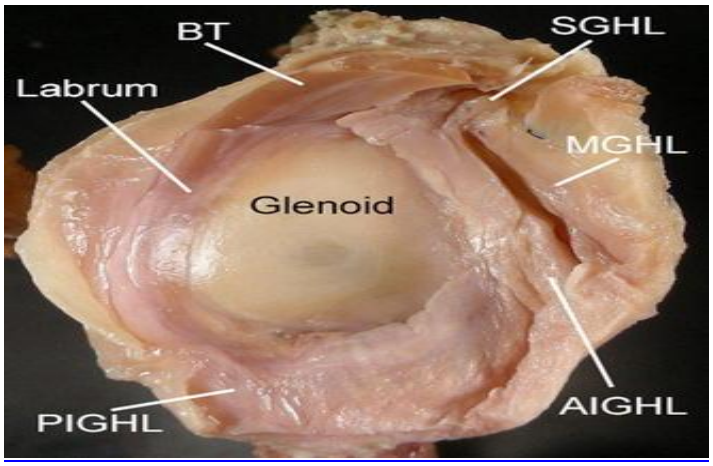

Figure (2): Glenoid of right shoulder with the labrum and glenohumeral ligaments. BT biceps tendon, SGHL superior glenohumeral ligament, MGHL middle glenohumeral ligament, AIGHL antero-inferior gleno-humeral ligament, PIGHL postero-inferior glenohumeral ligament [(12)].

In addition, the superior part of the labrum sometimes shows the variants. the Buford complex, in which the anterior–superior labrum is absent and replaced by a cord-like middle glenohumeral ligament (MGHL), can be encountered and may be misdiagnosed as a separation of the anterior labrum. The Buford complex is observed between 1.5 and 6 % of the normal shoulders [(12)].

Moreover, some authors have shown that the labrum is vascularized throughout the peripheral attachment of the joint capsule. This result may have clinical applicability in determining whether labral tears are repairable [(12)].

Regarding the function of the labrum, the labrum mainly has three key roles in contributing to stability of the glenohumeral joint. First, it doubles the antero-posterior depth of the glenoid socket from 2.5 to 5 mm and deepens the concavity to 9 mm in the superior–inferior plane. Second, the labrum enhances stability of the joint by increasing the surface area of