

Diagnosis of Shoulder Pain using Multi Type Data: A Study

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Abstract:

Pain sensation is one of the diagnostic indicators of sickness and it is prescribed as a horrible physical and sensitive involvement will relate with real or latent damage of tissue or defined in such standards. Pain is naturally relative each person interprets their feelings of pain with respect to their previous experiences with sensation. Shoulder Pain in joints are the indicator of difficulties inside the joints of shoulder or difficulties inside the tissues that adjoining the shoulder and rarely a mentioned pain owing to structures that missing from the shoulder such as heart, diaphragm, cervical spine and lung. Here three key modules are present in radiography of shoulder like soft tissue, joints and bones. The shoulder bones contain the lateral clavicle, the scapula proximal humerus, and the rib. Stemming from scientific and medical significance of emotion detection as well as the merits promised by the prospect of an objectively precise pain detection system this paper is built to facilitate such possibilities by using images, genomes and analysed data collected from the patient.

Keywords: Shoulder pain, x-ray, MRI, Genome sequence.

1. INTRODUCTION

The shoulder will form with socket and multifaceted joint that can move in several angles. By this excessive flexibility originates an absence of steadiness. The deficiency of firmness in shoulder creates a vulnerability for a pain and injury. Pain in shoulder is the most general illness in patients. Finding a cause for pain in shoulder is the most essential work for a doctor to help you with. This can treat the pain and also benefit you to avoid in the future.

The dislocations in shoulder are another problem that causes pain which is mostly seen at emergency department. Dislocations in shoulder can be called rendering to the supplanting the head of humeral relation to glenoid fossa: inferior, posterior, or anterior are the three dislocations, anterior will explain 95% of dislocations in shoulder, posterior is the 2nd most general and displacements in inferior creature the tiniest corporate. By their regularity, it is essential to list some of related radiographic pathology that might see dislocations through anterior, specifically the Bankart fracture and Hill-Sachs defect as visualized in Figure 1 [1].

Proximal humerus Fractures are not rarely seen, containing anatomical neck, surgical neck, as in figure 2, and tuberosity fractures may be high and less. Additional pathologies of a shoulder contain rib fractures, clavicular, scapular and acromion-clavicular dislocations of joint [2].



Figure 1. Fracture bankart in x-ray image



Figure 2. proximal anatomical neck

II.GENERAL ANALYSIS OF SHOULDER PAIN

To evaluate patients pain in shoulder, understanding the anatomy at the particular region is essential. The key structures in anatomic contains shown in figure 3.

- Bone has Four main structures: clavicle, rib, scapula and proximal humerus. Form the shoulder roof view the superior, anterior extension, the acromion of the scapula.
- Joints has Three main: AcromioClavicular(AC), glenohumeral, sternoclavicular.
- Four rotator cuff muscles/ tendons (SITS): subscapularis (adduction, internal rotation), supraspinatus (abduction), teres minor (external rotation, adduction), and infraspinatus (external rotation). The infraspinatus and supraspinatus tendons pass to complete the sub acromial phase to inset on the greater tubercle of humerus.
- Bursa: the sub acromial bursa affords a mitigate to rotator cuff tendons move lower the acromion.
- Musculature present on surround: deltoid, rhomboids, pectoralis, biceps, latissimus dorsi.
- Neurovascular: vessels and nerve suprascapular.

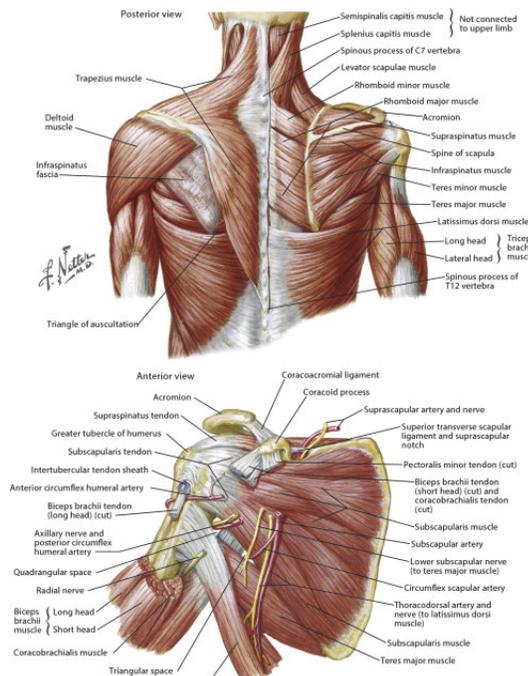


Figure 3. General awareness about shoulder pain

III.GENERAL CAUSES OF SHOULDER PAIN

Disease of Rotator cuff:

Rotator cuff disease(RCD) is a word including tendinopathy, partial widening in tear, or complete tear for one or more in rotator cuff tendons as shown in figure 4. RCD contains sub acromial bursitis. In common RCD is used synonymously through Subacromial Impingement Syndrome (SIS).

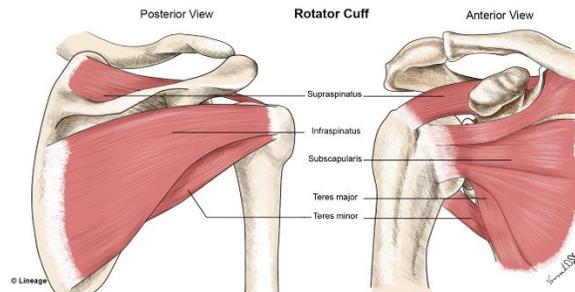


Figure 4. rotator cuff

Subacromial Impingement Syndrome(SIS):

The term SIS is an umbrella to involves rotator cuff tendinopathy and partial tears as well bursitis in subacromial as shown in figure 5. Pain and inflammation are produced through impingement or compression in supraspinatus tendon (most general), subacromial bursa, infraspinatus tendon, biceps tendon, or further structures that permit through space among the lateral aspect of acromion and humeral head. Functional impingement occurs while there is a difficulty with stability and mobility of a rotator cuff muscles, or scapula location and movement [16]. Risk issues for impingement contain repetitive action beyond the head, growing age, and situations like stroke and Parkinson disease.

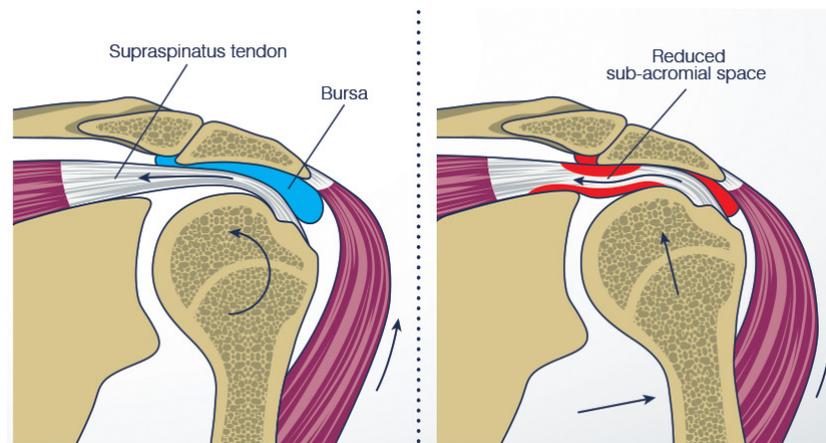


Figure 5: Subacromial Impingement Syndrome(SIS)

Frozen Shoulder (Adhesive capsulitis):

Pain in chronic and compactive and inactive mobility in the joint of glenohumeral is related through a selection of shoulder difficulties are happen as a key problem in an unknown reason. Adhesive capsulitis as shown in figure 6, typically patients at early 40s to 60s, however it is general in diabetics at whom it is possible to extant at an elder age. Adhesive capsulitis might determine spontaneously over an era of centuries, but reasons for a substantial pain and practical restrictions in the meantime [17].



Figure 6. Adhesive capsulitis (frozen shoulder)

Analysis of doctor through image:

Imaging of Shoulder must be minimal, contains lateral and anteroposterior view together. A regular methodology behaves clinicians in studying radiography: initially by checking that you are seeing at right patient, the accurate laterality (left or right), and preferred view earlier proceeding to analysis the bone densities, alignment, osseous cortex, and the structures of soft tissue.

In anterior-posterior (or anteroposterior) view, you must initiate through evaluating glenohumeral joint, the scapulothoracic joint and the acromioclavicular joint. The joint of sternoclavicular is naturally not observable. Then, check the structures of bony for luxation, fractures, gross deformities or cortical irregularities. Lastly, analysis the soft tissue for indication of soft tissue swelling or calcification. Moreover, the image was got the arm in both external rotation or internal rotation, you can express at the reduced or larger tubercle separately for fracture as in Figure 7 [2,3,4,5].

The view in lateral is enormously useful in estimating dislocation and fracture. Providers would initiate through seeing at glenohumeral joint and its connection with body of the scapula, coracoid and acromion process. The humeral head would centre over the glenoid fossa to create a Y shape as in Figure 8. You might check the bony structures (coracoid process, acromion, scapula, and proximal humeral shaft) for fractures as well soft tissues [6].

In view of axillary is enormously valued you to disturbed for dislocation, as this detailed view in location of the humeral head virtual to the glenoid fossa. In this view the humeral head and humerus neck and scapula are pictured well, the axillary radiograph reading is a choice to evaluate Bankart fracture, which includes fracture the anterior glenoid rim. An inadequacy of this view is for patient necessity remain incapable to capture the arm and patient might unable owing to pain. Alternatives views in a axillary view contains the Velpeau, modified Velpeau, and West Point views [7].

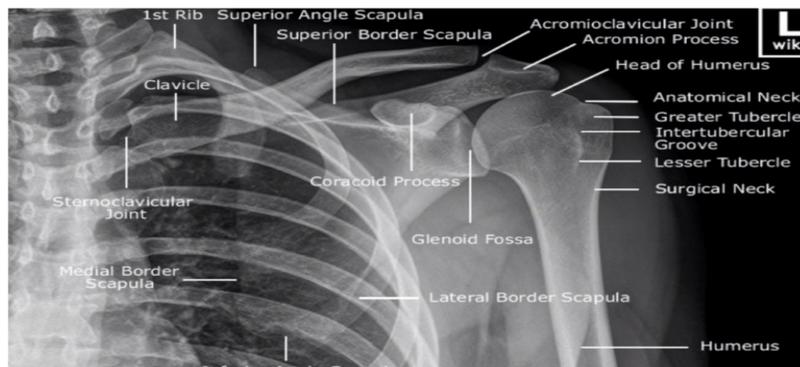


Figure 7. Arm in the internal rotator

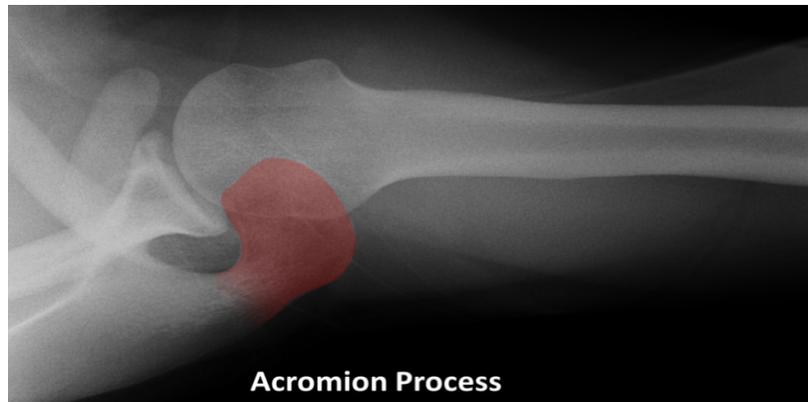


Figure 8. Normal acromion process

Shoulder analysis through image processing:

Crowell [11] recommend that the connection among physiotherapy practice and musculoskeletal imaging is distributed into three regions

- Image can have used for diagnosis at clinical,
- Image is used for managing injury, rehabilitation and lastly,
- Image is used for accurate treatment, specific ultrasound directed injections.

Image diagnosis is a beneficial resource for shoulder situations and used properly in a precious tool for physiotherapists. Images like X-ray, MRI, CT Scans and Bone Scans are main cases for useful diagnostic images that enable precise analysis, prediction, intrusion and valuation of injuries and dysfunction that physiotherapists address every day. Excessive image will not simply hypothetically squander financial capitals, increase the failure rate of conventional physiotherapy and growth of potential for premature surgery, hence it is crucial for recognize and understand the image when it is appropriate. Approximately scholars have recommended to rise the usage of image in diagnostic containing x-ray, ultrasound diagnostic and Magnetic Resonance Imaging (MRI) for pathology of shoulder is probably associated with the tasks in classification of pain in shoulder and how stages of practitioner assurance to create a clinical diagnosis accurately, explicitly a path anatomic diagnosis. [12,13,14]

As stated by American college of Radiology [10], basic films are chosen first for testing the atraumatic and traumatic shoulder pain. In the situation of traumatic case 3 views would be attained, these contain an anterior-posterior view in both external and internal rotation as well lateral Y or Axillary view [8]. In atraumatic shoulder pain, 2 views might regularly on anterior posterior view along with a scapular Y or axillary view are measured sufficient [9].

In order to classify shoulder plain in pathology, understanding of films based on normal anatomy is vital. There are three key modules in a shoulder radiography the joints, the bones, and soft tissue. The shoulder bones contain the proximal humerus, the scapula, the rib and the lateral clavicle. The scapula is subdivided into the glenoid, the coracoid and the acromion. The expression of these bones includes four major joints, explicitly the scapulothoracic, acromioclavicular and glenohumeral joint. However basic films deal restricted resolution in the reliability of soft tissue structures, clinicians would evaluate related nonosseous and musculature structures for gross abnormalities as shown in figure 9 [4].

Basic films are good for first test to any sort of pain in shoulder. Though, it is capable to discover most dislocations and fractures, further testing might be desired to identify radiographically occult injuries. Situations like rotator cuff tears, impingements of nerve and degenerative variations are not well described in X-ray and might need additional images like CT, ultrasound, or MRI.



Figure 9. different views of shoulder pain

Shoulder analysis through genome:

In present scenario, genetics with musculoskeletal pain [22] and understandings of mechanisms prominent to this situation. This pain occurs without a perfect cause of pathophysiological like damage of tissue or injury which cannot recognized as a recognized disorder. The studies in the genetics of musculoskeletal pain and dissimilar genetics at site specific pain sorts and its general risk factors like lumbar disc generation and osteoarthritis. To study these experts has to focus on validation and identification of novel genes and loci related through musculoskeletal pain as shown in figure 10, via genome wide association studies or approaches of candidate gene [21]. These emphasizing in progressive features of genetics like unusual variant analysis, genotype identification through interactions of environment and genetic effects on sex-specific as shown in figure 5. To assistant mechanisms of pathological, readings in the area of transcriptomic are relevant tissues. This will particularly help in determining the fields like

- Genetic association studies will help to find the circumstances and risk causes.
- The genotype through interactions of environment in musculoskeletal pain.
- The tissues study with relevant transcriptomic
- With different exposures of pain is randomized

The most relevant musculoskeletal pains are considered as pains in neck, low back and shoulder. The study of genetic predisposition to shoulder pathology by way of a systematic search and review of candidate gene association studies [23] and identified single nucleotide polymorphisms (SNPs). Detailed biological mechanisms are essential for pain are yet to be explained. Discovering the genetic supporting of pain in chronic phenotypes can increase basic information on their mechanisms etiology and biological. Advance diagnostics and assist the growth of real therapies through identification of targets in therapeutic.

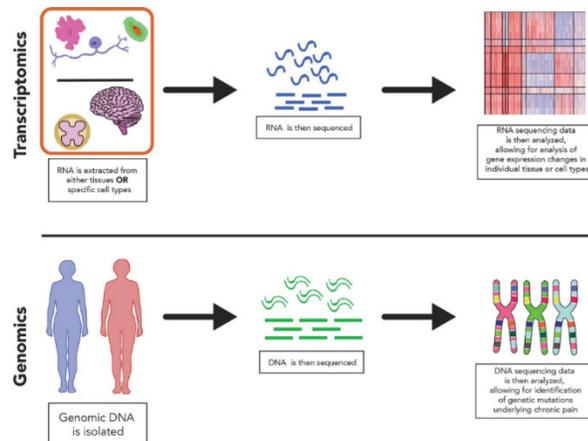


Figure 10. procedure of analysing pain using genome sequencing

Shoulder analysis through outpatient:

A health survey helps you to gather critical patient feedback but also provides you with a tool to improve communication between your healthcare team and patients. This survey helps to collect information that doesn't come up in doctor/patient conversation or on lab tests. Although patients may hesitate to offer direct in person feedback, anonymous surveys provide them with a way to do so privately.

Relating the answers through physical examination, radiographs and patient's history would allow the doctor to frame diagnosis. Budding problems diagnoses contains patient's problems are underlying with more than one questions as shown in figure 11, like symptomatic acromioclavicular osteoarthritis and rotator cuff tear or less generally origin the pain. The distinctive representations of general reasons of pain in chronic shoulder are estimated. To estimate this a study will be conducted by selecting patients randomly [18] who presented in orthopaedic outpatient set up with complaints of shoulder pain and disability. To this developed a certain questionnaire and studied on different patients through shoulder pathology. Here test- retest reliability of the Pain in Shoulder and Disability Index (SPADI) and subscale scores are ranged. SPADI has total of 13 questions scored on a pictorial analog scale ranging from 0 to 10. 5 questions [19] are pain related (38.46%) and 8 are disability related (61.53%). Thus, both OSS (Oxford Shoulder Score) and SPADI are almost similar in terms of number of questions and in terms of the percentage of their individual categorized items. In OSS there are totally 12 questions per 5 points response, lowermost (best score) is 12 and uppermost (worse score) is 60. Out of 12 questions 4 are pain related items (33%) and 8 are disability related items making upto 67% [20].

Item	Question	Action
1	Did the study use any of the eligible study design (cross-sectional or longitudinal studies)?	Yes, move to the next question No, exclude
2	Did the study involve people with shoulder pain?	Yes, move to the next question No, exclude
3	Was shoulder pain caused by a systemic disease, neurological disorders, and/or chronic non-musculoskeletal pain?	No, move to the next question Yes, exclude
4	Did the study report pain beliefs measures?	Yes, move to the next question No, exclude
5	Did the study show the predictive value of pain beliefs on pain intensity and/or disability, or at least an association between pain beliefs and pain intensity or disability?	Yes, move to the next question No, exclude
6	Did the study try to modify pain beliefs levels through any therapy?	No, Include in the review. Yes, exclude

Figure 11. some general questionnaires of health survey

IV. CONCLUSION

Mostly people think that pain in shoulder can resolve over time. The various symptoms of shoulder conditions overlap, which can make a diagnosis difficult. This may probably have a medical and physical examination in order to diagnose shoulder pain or injury. Thus using the imaging tests like x-ray or MRI to conform the diagnosis. This will give the right diagnosis is critical in order to accurately treat the shoulder pain or injury. By initiation of huge balance of genotyping program now it is potential to monitor the whole genome for polymorphisms related with risks in pain or injury. A wide screen genome for shoulder pain or injury might provide novel insights concerning the changes among personalities in their natural partiality for injury and disclose understandings through fundamental mechanisms of shoulder tendinopathy. By survey information analysis can identify inconsistencies and gaps in quality patient care. This enables healthcare organizations develop effective action plans to make needed improvements. Working with the healthcare team and using these three analysis for self-management

methods resolve can lead to finest consequences. The treatment might need a knowledgeable physiotherapist to attend through a complete rehabilitation programme.

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