



**Ain Shams University
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The Validity of Musculoskeletal Ultrasonography Imaging in Diagnosis of Lupus Hand Arthropathy

Thesis

**Submitted for partial fulfillment of Master Degree in
Physical medicine Rheumatology and Rehabilitation**

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2015**

ACKNOWLEDGEMENT

First and foremost, I thank **ALLAH** the most merciful & helpful.

Also, I wish to express my deer sincere fellings towards **Prof. Dr. Hanan El Sabaie**, Professor of Rheumatology and Rehabilitation, Faculty of Medicine, Ain Shams University for her kind close supervision, advice guidance and encouragement. She kindly helps me to have this work in its complete form.

I am lucky to be supervised and directed by **Prof. Dr. Mohamed Abdel Hafez Mansour**, Professor of Rheumatology, Head of Rheumatology Department in El Glaa Military Hospital for his moral support, guidance and encouragement in all of this work.

I am also very grateful to **Dr. Ola Abdel Naseer**, Professor of Rheumatology, Ain Shams University, for her help support and encouragement throughout this work.

I am also very grateful to **Dr. Mahmoud Fathallah**, Assistant Professor of Rheumatology, Ain Shams University, for her help support and encouragement throughout this work.

I am also very grateful to **Dr. Ahmed Mohamed Attia**, Head of Departement of Physical Medicine and Rehabilitation in El Glaa Military Hospital for her help support and encouragement throughout this work.

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LIST OF ABBREVEATION

Ab	: Antibody
ACPA	: Anti –Citruinated Peptide Antibody
ACR	: American Collage Of Rheumatology
C3	: Complement 3
C4	: Complement4
CT	: Computerized Tomography
ECG	: Electro Cardiogram
GLOSS	: Global Omeract Sonography Score
GSUS	: Grey Scale Ultrasound Score
JA	: Jacooud Arthropathy
LA	: Lupus Anticoagulant
MCP	: Metacarpophalengeal
MHZ	: Mega Hertz
MRI	: Magnetic Resonance Imaging
MTP	: Metatarsophalengeal
OMERACT	: Outcomes Measures In Rheumatoid Arthritis Clinical Trials
PDUS	: Power Doppler ultrasound score
PIP	: Proximal Interphalengeal
PRF	: Pulse Repetition
RA	: Rheumatoid Arthritis
RF	: Rheumatoid Factor
ROC	: Receiver Operating Characteristic
SD	: Standard Deviation
SLEDAI	: Systemic Lupus Erythematosus Disease Activity Index
SLICC	: Systemic Lupus Internat Colleberating Clinics
SPA	: Spondiloarthopathies

US : Ultrasound

INTRODUCTION

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease that can affect almost many organ systems such as skin, joints, kidney & serosal membranes .Although the specific cause of SLE is unknown, multiple genetic predispositions and gene-environment interactions have been identified **(Livingston et al .,2011)**.

Painful joints are the most common presenting symptom of SLE, with frequencies reported between 76% to 100% in the form of arthralgia. In others cases the classical signs of a true arthritis Or Lupus related conditions as Osteonecrosis, Osteoporosis (micro fractures), Tendinitis, Fibromyalgia, Myosotis, Myalgia & infection may be the presenting features **(Mimouni et al., 2004)**.

Although arthritis can affect any joint, it is most often symmetrical with involvement of the small joints of the hands (proximal interphalangeal and metacarpo-phalangeal joints), wrists and knees, but sparing the spine. Hand arthritis in SLE is nonerosive and generally non deforming deformities are secondary to involvement of para articular tissues, such as the joint capsule, ligaments and tendons, and are referred to a Jaccoud –like arthropathy.but erosive arthritis (rhupus hand) or mild deforming arthropathy may be present. **(Mimouni et al., 2004)**.

Jaccoud's arthropathy is a deforming non-erosive reversible type of arthropathy including ulnar deviation at the MCP joints, the absence of erosions on X-ray imaging, swan neck deformities, z-shaped thumb, boutonniere deformities and limited MCP extension. **(Caznoch et al., 2006)**

Mild Deforming Arthropathy includes patients who have obvious deformity and no erosions while Erosive Arthritis which has been estimated by several studies to be <5% of SLE patients an radiological erosive pattern similar to RA develops **(Martinez et al., 2007)**.

Previous published studies have shown results to the association of jacooud arthropathy with antibodies in lupus patient as lupus anticoagulant, also Anti ccp has role to predict a more erosive subset **(Qing et al., 2009)**.

Myositis is acomman complain in lupus patient were may manifest as weakness in SLE but is more commonly related to overlap syndromes or corticosteroid induced myopathy. Fibromyalgia, distinguished as myofascial tenderness without weakness is commonly concomitant with SLE causing generalized widespread pain, arthralgia, and myalgia **(muscal et al., 2008)**.

Nowaday, Musculoskeletal ultrasound (MSUS) emerged as a key diagnostic tool among rheumatologists. It offers several inherent advantages. Being noninvasive, painless with a quick scan time and without radiation makes it well accepted by patients and the ability to visualize target structures in real time makes it an ideal tool for the guidance procedures used in diagnosis and management **(Del Cura et al., 2008)**. The addition of power Doppler (PD) provides a sensitive assessment of soft tissue hyperaemia **(Iagnoccoa et al., 2004)**.

MSUS is seven times more sensitive than plain radiography in the detection of erosions, allowing earlier diagnosis of progressive arthritis. Ligament, muscle, peripheral nerve and cartilage pathology can also be readily demonstrated by MSUS

MSUS has many significant advantages MRI, and CT scans. These include: better resolution of soft tissue than MRI, convenient in-office service; no need to go to another facility, no exposure to ionizing radiation, no claustrophobia, the ability to perform a dynamic or "live" study; we can see the injured area move and look for evidence of injury, more cost-effective, ability to see inflammation, ability to guide injection. For example, MSK US has been shown to be equal to or even better than MRI for looking at the rotor cuff. Also, MSK US allows the physician to look for signs of joint instability, unlike x-rays or MRI (**Wakefield et al., 2000**).

Also US is more sensitive than clinical examination in the detection of joint and tendon inflammation in patients with SLE (**Tani C et al., 2011**) in addition to its ability to distinguish between degenerative and inflammatory pain cause (**Hashefi M et al., 2009**).

There are two semiquantitative classification systems for grayscale MsUS evaluation of metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joint synovitis have been studied. One approach emphasizes qualitative assessments of the location of visible synovial tissue (**Szkudlarek et al., 2003a**). The second method grades detectable synovial tissue or fluid as: "absent", "Minimal", "Moderate", or "Extensive" (**Scheel et al., 2005**).

Similarly, two semiquantitative scoring systems for Doppler examination are commonly reported, the first grades Doppler finding as "none", "mild", "moderate" or "marked". (**Newman et al., 1996**), and the second assigns a descriptive grade that includes the proportion of synovium with visible Doppler signals (**Szkudlarek et al., 2003b**).

A recent study was done on a group of SLE patients who showed hand involvement, Joint effusion Or synovial proliferation were visualised in the wrists and at the MCP joints. In this study only the 2nd and 3rd MCP and PIP joints were assessed. US abnormalities were detected in patients (59.2%). (40.7%) had tendon involvement and (20.3%) had both Synovitis (joint effusion and/or synovial proliferation with or without PD signal), and bone erosions were revealed in (25.9%). Wrist synovitis was found in (12.9%), and hand synovitis was found in (15.7%). Twenty-eight patients (25.9%) showed erosions; (24.1%) had erosions in the hands and (4.6%) had erosions in the wrists. The presence of PD signal was found in the tendons of (12%) and in the joints of (17%). Flexor tenosynovitis was found in (29.6%) of patients, extensor tenosynovitis in (34.2%) and both were found in (20.3%). **(S Wright et al.,2012).**

In 2007 a case report by Saketkoo et al was published, on the detection of bone erosion with US in a SLE patient, then revisiting the deformities caused by Jaccoud's arthropathy and stressing the role of US in the better definition of joint involvement in SLE patients. **(Saketkoo et al., 2007).**

So, MSKUS and PD helps physicians to guides clinical management and assesses treatment response of the SLE patient.**(Torrente-Segarra V et al., 2009).**