Yueh-Ling Hsieh*, Chen-Chia Yang, Fang-Chuen Huang. High-fluence Low-level Laser Irradiation Treatment Reduces TNF-α and MMP3 Expressions in Early Stage of Rat Rheumatoid Synovium. The APLAR Symposium 2013, Aug 29-Sep 1, Bali, Indonesia.

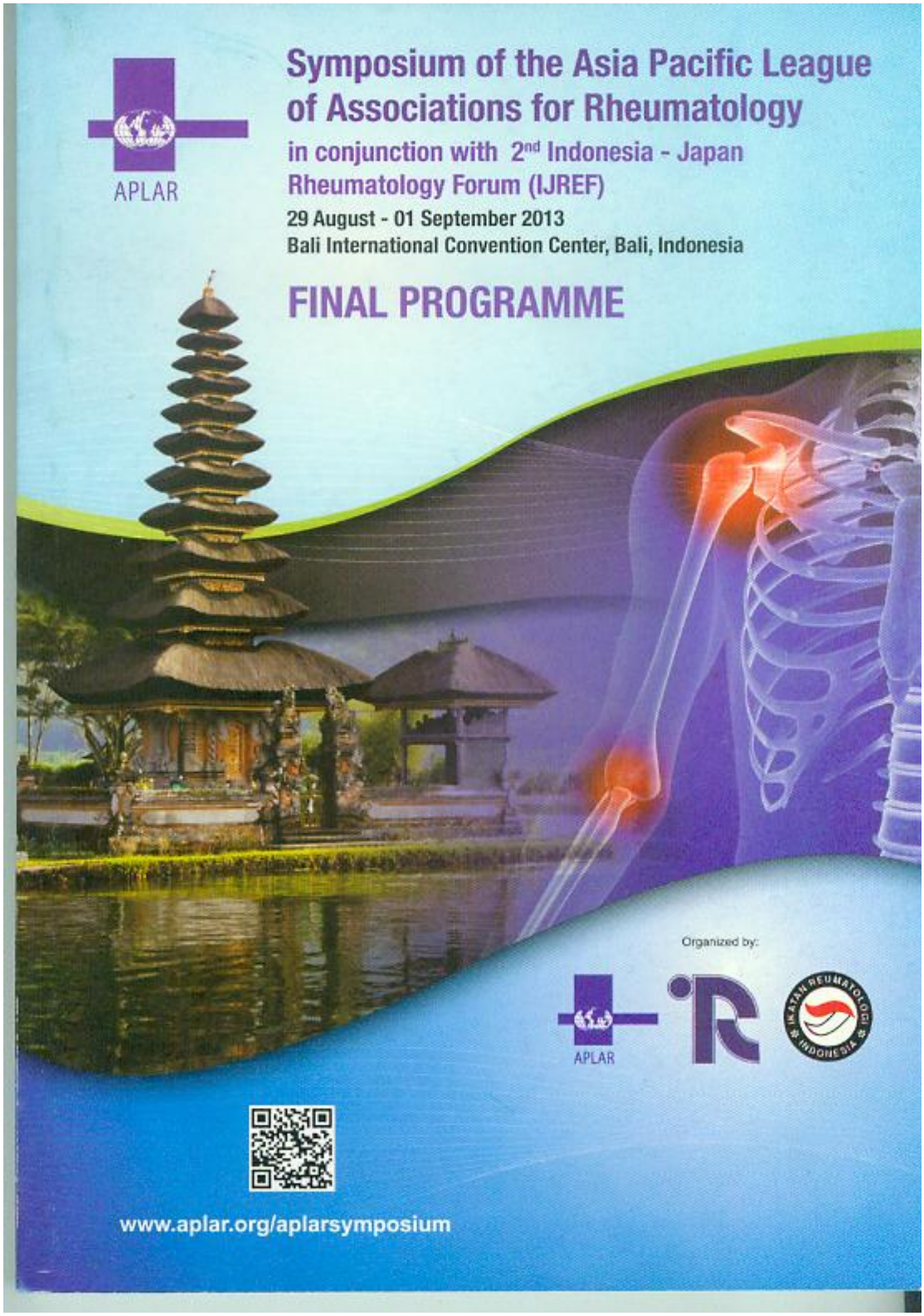

TABLE OF CONTENTS

International Journal of Rheumatic Diseases

Symposium of the Asia Pacific League of Associations for Rheumatology in conjunction with 2nd Indonesia-Japan Rheumatology Forum (IJREF)
29 August – 1 September 2013
Bali, Indonesia

Allied Health Research Topics: T26 – Physiotherapy

APLAR-0295

Assessment of spinal mobility in juvenile healthy volunteers using supine and standing posture

Y LI[1], SL ZHANG[2], J ZHU[1], F HUANG[1]

[1]*Department of Rheumatology, Chinese PLA General Hospital, Beijing, China,* [2]*Department of Rheumatology, Fuzhou General Hospital of Nanjing Military Command, Fuzhou, China*

Introduction: Spinal mobility is commonly assessed during the evaluation of functional status and therapeutic outcomes of ankylosing spondylitis, however, performance of some measures is time-consuming and may not be feasible in clinical practice. This study were designed (1) to explore the influence factors of spinal mobility, and (2) to compare the results of spinal mobility were measured by sitting and supine posture respectively.

Materials and Methods: Initial recruitment identified 223 healthy participants (188 males, 35 females) aged 18–23 years from community residents of north and south city in China.

Results: Statistical difference was found with tragus to wall distance, cervical rotation (sitting position), intermalleolar distance (standing position), modified Schober's test, fingertip-to-floor distance and chest expansion between males and females ($P < 0.05$). Northerners had significantly higher levels of tragus to wall distance, intermalleolar distance and chest expansion than southerners ($P < 0.05$). Weekly exercise volumewere positively correlated with cervical rotation (supine position), intermalleolar distance (standing and supine position) and chest expansion ($P < 0.05$). Height was positively correlated with intermalleolar distance ($P < 0.01$) after controlling for body weight and exercise. Body weight was positively correlated with tragus to wall distance and modified Schober's test ($P < 0.05$). There were statistical difference between standing and supine position intermalleolar distance ($P < 0.05$), and between sitting and supine position cervical rotation in females ($P = 0.025$).

Conclusions: Spinal mobility was affected by gender, height, weight, exercise and geographical factors. The affecting factors should be considered when the standard of spinal mobility was formulated. The intermalleolar distance can not reflect very well activity of hip joint for the height because of differences of height. The measurement of cervical rotation by supine position could reduce the influence of shoulder rotation than sitting position, this way may be more scientific.

APLAR-0354

High-fluence low-level laser irradiation treatment reduces TNF-alpha and MMP3 expressions in early stage of rat rheumatoid synovium

Y HSIEH[1], C YANG[2], F HUANG[1]

[1]*Physical Therapy, China Medical University, Taichung, Taiwan,* [2]*Department of Physical Medicine and Rehabilitaion, Cheng Ching General Hospital, Taichung, Taiwan*

Rheumatoid arthritis (RA) is a chronic, inflammatory and systemic autoimmune disease that leads to progressive synovitis. Treatment of RA is very complex, severalstudies have investigated the use of low-level laser therapy (LLLT) in pain symptoms of RA. However, it remains unknown if LLLT can modulate early stage of RA on synovitis in a dose-dependent fashion. With this perspective in mind, we evaluated the anti-inflammatory effects of LLLT at low and high fluences in early RA progression stage. Monoarthritis was induced in adult male Sprague-Dawley rats (250–300 g) via intraarticular injection of complete Freund's adjuvant (CFA, 50 μL) into the tibiotarsal joint. All CFA-induced arthritic (CIA) animals were randomly divided into four groups: (1) animals with CIA and treated with 660-nm GaAlAs laser at high fluence (72 J/cm^2); (2) animals with CIA and treated with sham-high-fluence laser irradiation (0 J/cm^2); (3) animals with CIA and treated with laser at low fluence (4.5 J/cm^2); and (4) animals with sham-low-fluence laser irradiation (0 J/cm^2). LLLT treatments were performed 3 days after CIA for 10 consecutive days. All animals were sacrificed at the 14th day from RA induction and articular tissue was colected in order to assess inflammation in synovium by immunofluorescent studies with 5B5, ED1, TNF-α and MMP3. We observed that LLLT at a fluence of 72 J/cm^2 significantly reduced the expressions of 5B5-, ED1- TNF-α- and MMP3-like immunoreactivities when compared to the other groups at early stage of RA ($P < 0.05$). We suggest that high-fluence LLLT is able to modulate inflammatory responses in early progression stages of RA.

APLAR-0355

Comparative effects of low- and high-intensity laser combined with intraarticular hyaluronan injection in an animal model for rheumatoid arthritis

C YANG[1], Y HSIEH[2], F HUANG[2]

[1]*Department of Physical Medicine and Rehabilitation, Cheng Ching General Hospital, Taichung, Taiwan,* [2]*Department of Physical Therapy, China Medical University, Taichung, Taiwan*

Purpose: Many studies demonstrated that supplement of hyaluronan (HA) could decease hyperanalgesic, inflammation and lubricates joint. Recently, intraarticular injection of HA (IAHA) for treating rheumatoid arthritis (RA) is more common, but the ethicacy was limited due to its side effects of pain at the injection site and inflammatory pain. Low-level laser therapy is the proven and recommended intervention for managing pain, but the dosage of laser therapy is still controversy on RA-related pain. The purpose of this study was to investigate the effects of combined use of low- or high-intensity laser therapy (LILT or HILT) combined with IAHA on pain and inflammation in rats with complete Freund's adjuvant-induced arthritis (CIA).

Materials and Methods: Monoarthritis was induced in adult male Sprague-Dawley (250–300 g) via intraarticular injection of complete Freund's adjuvant into the tibiotarsal joint. The CIA animals were divided into four groups: control (no treatments), IAHA, LILT (4.5 J/cm^2)+IAHA, and HILT (72 J/cm^2)+IAHA groups. Seven days after CIA, combined use of laser therapy and IAHA were administered for 8 consecutive days and once every other day respectively. Functional evaluations of pain behavior, histology, and pro-inflammatory cytokines were performed. Results: The mechanical withdrawal pain threshold were significantly improved in HILT+IAHA group when compared with those in the IAHA, LILT+IAHA and control groups. Both HILT and LILT combined with IAHA can reduce inflammation by suppressing TNF-α, iNOS and ED1 accumulation at synovium.Conclusions: Our findings suggest that HILT combined with IAHA can decrease hyperanalgesia by increasing mechanical pain threshold. IAHA combined with LLLT at either high- or low-intensity can modulate inflammatory mediators. Therefore, LLLT has a synergistic effect in providing greater improvement combined with IAHA on RA treatment.