

# INTEREST OF RADIAL SHOCK WAVE THERAPY IN THE PLANTAR FASCIITIS TREATMENT

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## Introduction et objectif :

Au cours de cette dernière décennie, la thérapie par ondes de choc radiales a connu une réelle expansion. Indiquée dans les tendinopathies chroniques, son efficacité réelle reste toutefois encore à démontrer. L'objectif de l'étude est de démontrer l'intérêt des ondes de choc radiales dans le traitement de la fasciite plantaire.

## Matériel et méthode :

Notre expérimentation était une étude longitudinale sur 12 semaines divisée en deux périodes : la phase de contrôle (semaine 0 à semaine 6) et la phase de traitement (semaine 6 à semaine 11). Elle comprend 3 évaluations (T1, T2 et T3) respectivement à 0, 6 et 11 semaines.

Notre batterie de tests s'est composée d'une EVA de la douleur, un questionnaire de retentissement algo-fonctionnel de la cheville (FFI modifié), un test à l'algomètre et une analyse dynamique du pied sur plateforme de force.

La thérapie par ondes de choc radiales a été réalisée à l'aide de l'appareil Swiss DolorClast (Electro Medical Systems).

## Résultats :

L'analyse statistique a mis en évidence que le traitement par ondes de choc radiales induit une amélioration hautement significative ( $p<0,0001$ ) du score obtenu à l'EVA (50%), du score du retentissement algo-fonctionnel de la cheville (62,6%) et du seuil de la sensibilité douloureuse (49,6%). Par ailleurs, nous avons pu observer, à la suite du traitement, une tendance (non-significative) à l'augmentation du temps de contact pied-sol. Enfin, l'amélioration du seuil de sensibilité douloureuse entre T2 et T3 est corrélée avec l'âge ( $p=0,012$ ).

## Conclusion :

L'utilisation des ondes de choc radiales dans la prise en charge de la fasciite plantaire a favorisé la diminution de la douleur et l'amélioration fonctionnelle du pas. Toutefois, des études supplémentaires réalisées sur des populations de plus grande taille sont à réaliser pour confirmer nos résultats.

## Introduction and goal:

First effects of radial shock wave on human body have been observed in the 1940's during the World War II upon victims of distant submarine bombs explosion. Derived from focal shock waves instrument, easier to use and cheaper, the first radial shock wave machine was born about 15 years ago. Considering the concrete lack of scientific validation about the efficiency of radial shock wave in plantar fasciitis treatment, the survey's goal was to evaluate the interest in chronic plantar fasciitis treatment on the algetic and functional point.

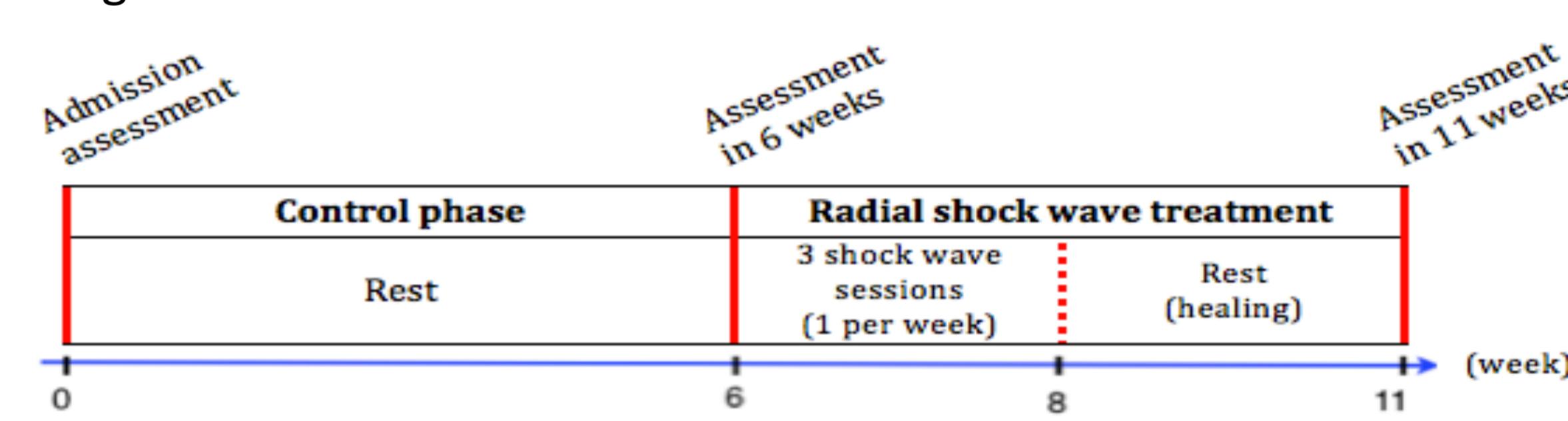
## Population :

Table I : Characteristics of 30 patients included in the study			
Variables	Categories	Fréquence (%)	Average ± Standard Déviation
Age (years)			51,9 ± 11,0
Sex	Woman	19 (63,3)	
	Man	11 (36,7)	
Insoles	With	17 (56,7)	
	Without	13 (43,3)	
BMI (kg/m <sup>2</sup> )			29,1 ± 4,53
Infiltrations	Yes	5 (16,7)	
	No	25 (83,3)	
Sport	Yes	10 (33,3)	
	No	20 (66,7)	
Foot	One foot	22 (73,3)	
	Two feet	8 (26,7)	
Calcareal spur	Yes	20 (66,7)	
	No	10 (33,3)	

Patients included in this study have been selected on a plantar fasciitis diagnostic, and inclusion and exclusion criteria. Principal criteria of inclusion are the chronic plantar fasciitis (>3months), age >18years and presence or not of Lenoir thorn (Table I).

## Protocol :

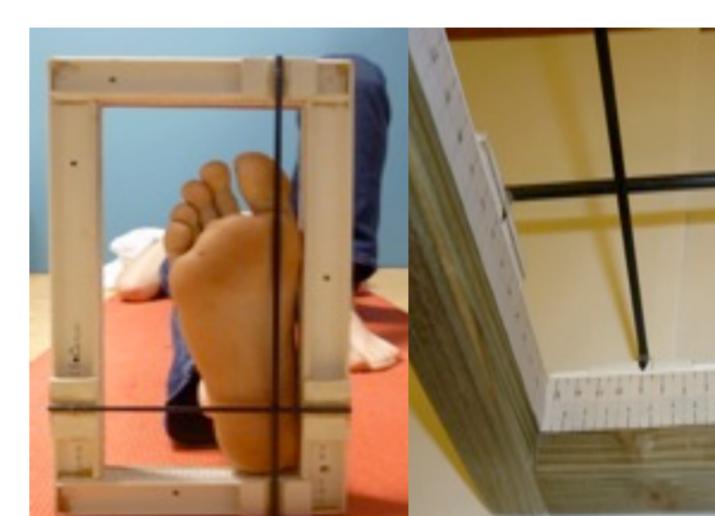
The process validated by the hospitalo-faculty ethical committee university of Liège (707)\* contained a control phase and a radial shock wave treatment. The control or observation phase (week 0 to week 6) contained an initial check-up and an intermediary check-up (week 6). The treatment (week 6 to week 11) was divided into 2 sub-periods. The first one contained 3 shock wave sessions, 1 per week. The second one, while the plantar fibrous tissue was healing. The efficiency of the shock wave treatment was evaluated thanks to the final check-up.



\* Belgian reference B707201317514 (ethical case 2013/122)

## Evaluation tools :

- Visual Analogue Scale of pain : VAS
- Modified "Foot function index" survey
- Algometer test
- Strength platform



Helped by an unique device, we identified the most algetic coordinates in order to optimize the reproducibility of the algometer test placement during the later assessment. In order to avoid any error during the spotting, medial edge of the foot was placed in touch with the vertical line of the skeleton.

## Equipment and configuration :



The equipment used for the experiment was the Swiss DolorClast Power, a generator of radial shock waves. The shock waves applicator "pistol" used is the "Power Pulse". The transmitter (15mm of diameter) was concave and delivers "focus" waves. The patient was in a dorsal decubitus position and the ankle in an anatomical reference. The number of knocks freed during a session was 2000. Frequency selected was 10 hertz and the pressure chosen was 4MP (MégaPascal).

## Results :

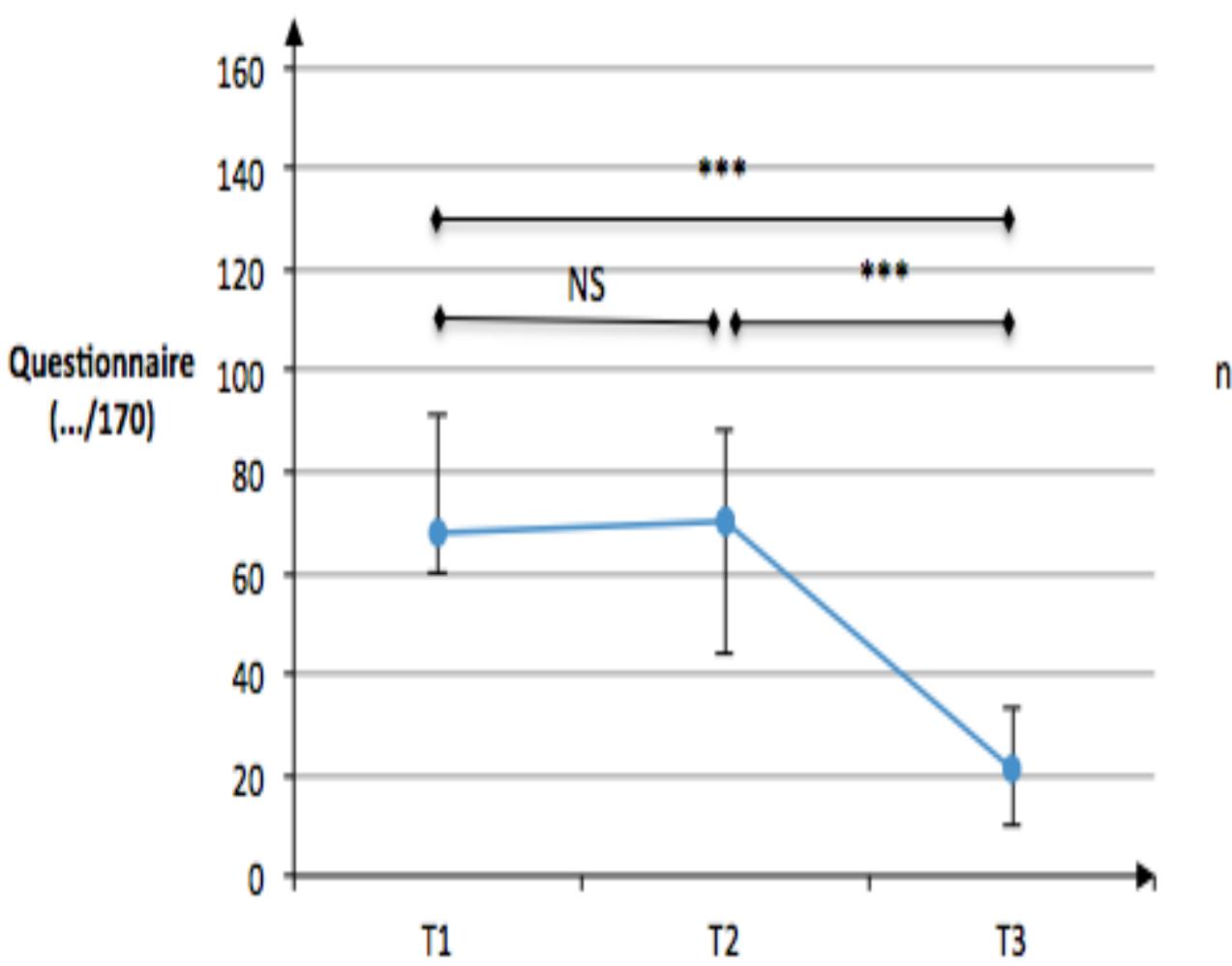


Fig I.1 : Evolving of the ankle's algo-functional repercussion acquired during the 3 steps of the survey (T1, T2, T3) - (n=30) - (Median, P25-P75) - \*\*p<0,0001 et NS=Not Significant.

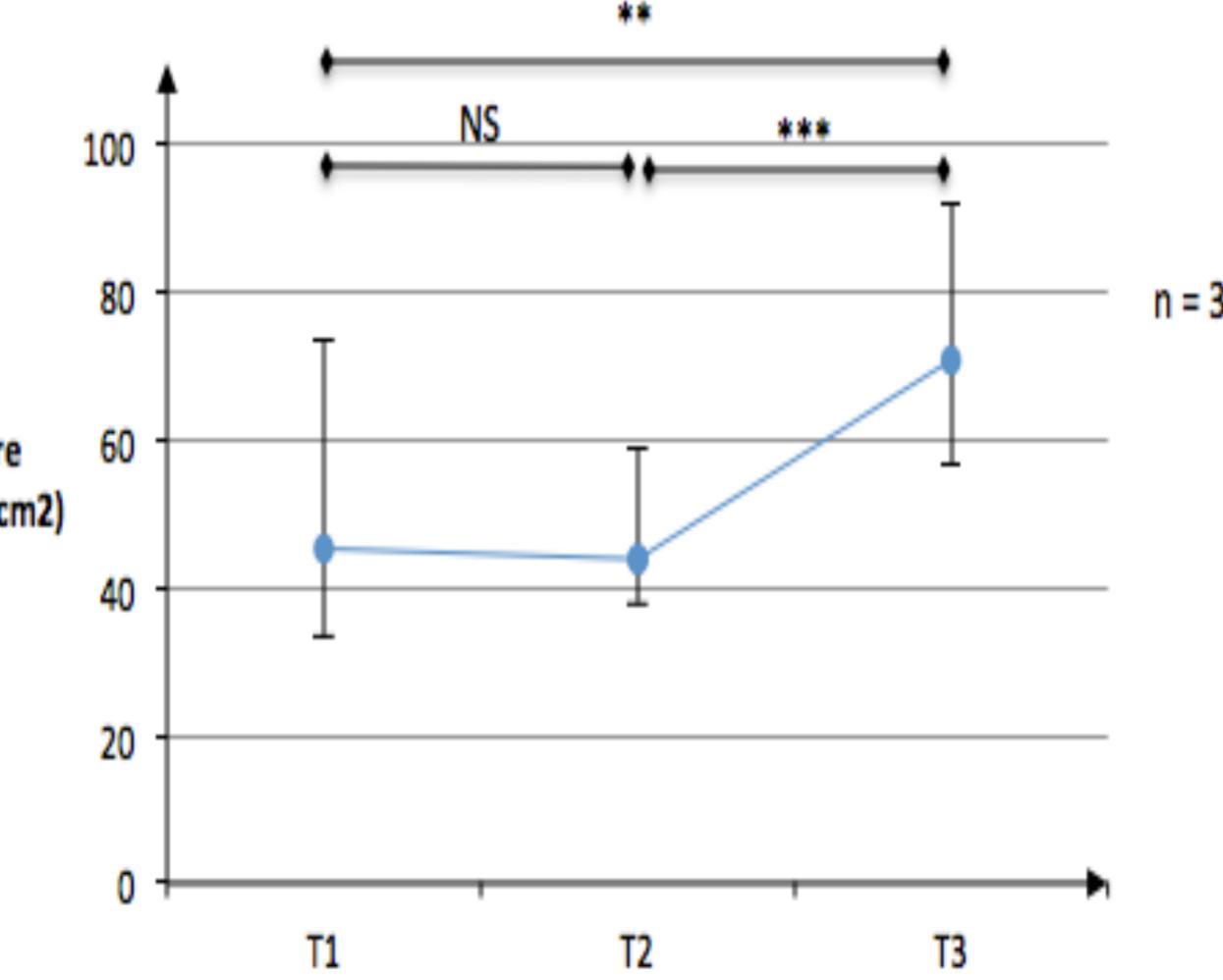


Fig I.2 : Evolving of the painful-sensitivity's threshold during the 3 steps of the survey (T1, T2 et T3) - (n=30) - (Median, P25-P75) - \*\*p<0,0001 et \*\*\*p<0,0001 et NS=Not Significant.

Some of the patients wore orthopaedic soles which have been mostly prescribed from the beginning by the protocol (to T1). This led to us to realize a complementary analysis of two sub-groups (with and without soles).

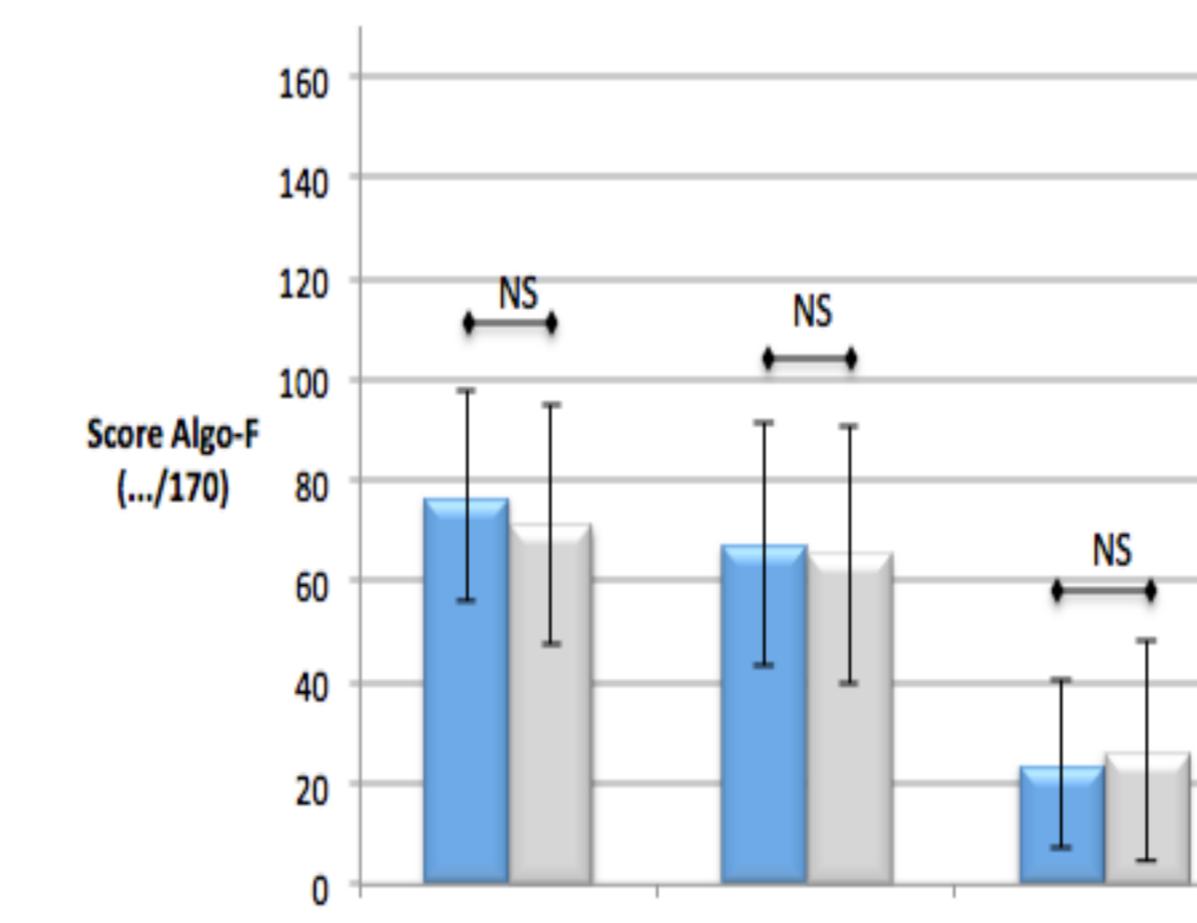


Fig II.1 : Score of the ankle's algo-functional repercussion acquired during the 3 steps of the survey (T1, T2 et T3) for the "without insole" group and the "with insole" group - (n=30) - (Average ± 1Standard Deviation) - NS=Not significant

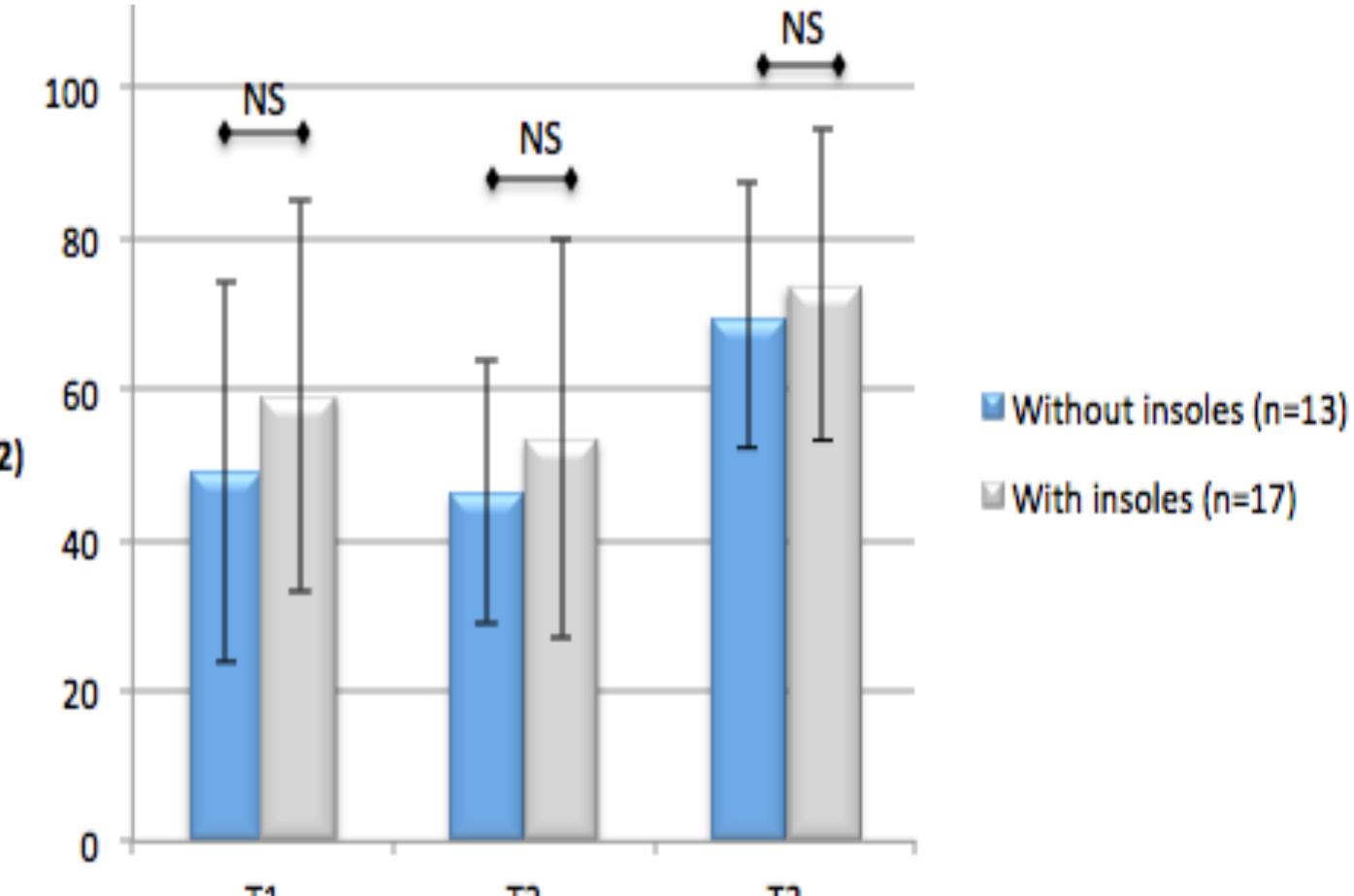


Fig II.2 : Score of the painful-sensitivity's threshold during the 3 steps of the survey (T1, T2 et T3) for the "without insole" group and the "with insole" group - (n=30) - (Average ± 1Standard Deviation) - NS=Not significant

## Discussion et conclusion :

Our results' analysis (Fig I.1 et I.2) allowed us to believe in the verification of the antalgic, anti-inflammatory and neovascularisation effects due to the shock waves therapy on our population who had risk of blood microcirculation deterioration and chronic inflammation (sex, age, BMI) (Table I).

The analysis of the results estimating the evaluation of the repercussion of the orthopedical insole wearing for patients, who were victims of plantar fasciitis and subjected in a common therapy via radial shock waves, pointed out the unsignificant difference between the "without insole" group and the "with insole" group (Fig II.1 et II.2). Most of the patients received their insole on T1.

The significant improving of the algo-functional score and the algometer test allowed us to assert that the shock wave therapy led to the reduction of the pain and a functional improving. The survey allowed us to conclude that the radial shock wave therapy is efficient in the short term for the plantar fasciitis treatment.