

## Place of Physical Medicine and Rehabilitation in the Management of Heel Pain

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### ABSTRACT

Talalgia is the origin of significant limitation of function in patients. From the point of view of physical medicine and rehabilitation, management is done from the initial phase, that is meaning from diagnosis to therapeutic management. Talalgia is pain of mechanical origin most of the time and the management combine dietary measures and medical treatment with the use of oral or local analgesics if necessary. The guidelines combines physical treatment and pharmacological therapies. A rehabilitation program will be given to the patient adapted to the deficiencies observed.

**KEYWORDS:** talalgia ; functional evaluation ; spondylarthropathies ; plantar fasciitis ; rehabilitation.

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### INTRODUCTION

Talalgia is defined as heel pain. The heel corresponds to the back of the foot which is made up of the calcaneus and the tissues around it (pericalcaneal soft parts). This is the second reason for consultation after metatarsalgia. They have various etiologies, mechanical as well as inflammatory, infectious, traumatic and tumoral.

Therefore, an interview followed by a well-conducted physical examination and a topographical diagnosis are necessary prerequisites for etiological research.

### ANATOMICAL REMINDER

Understanding the anatomy of the heel is necessary to know the conditions that affect this anatomical region. The heel is located at the back of the foot, it is a region which supports strong mechanical stress because it supports two thirds of the weight when walking.

The heel is made up of the calcaneus, the posterior insertion zones of the achileus tendon as well as the plantar aponeurosis, the bursae and serosa and the soft covering parts which are support zones (subcutaneous fat and skin).

The calcaneus is the largest bone of the tarsus, parallelepiped in shape with a long axis oblique upwards and forwards relative to the horizontal. Six faces are described; it articulates above with the talus to form the subtalar joint; the latter particularly complex is made up of two joints, namely the anterior talocalcaneal joint and the posterior talocalcaneal joint. It is articulated at the front of the foot by the calcaneo-cuboid joint.

The achileus tendon is a large fibrous formation which connects the triceps surae to the calcaneus; it is inserted on the posterior surface of the latter. It is the largest tendon in the human body.

The plantar aponeurosis or plantar fasciitis is inserted into the lower part of the calcaneus; it is a thick fibrous structure; it is triangular with a posterior apex and extends from the calcaneus to the metatarsals. It has three parts, medial, middle and lateral.

The plantar aponeurosis belongs to the suro-achileo-calcaneo-plantar system which plays a role during the ascension of the heel when walking.

The bursae separate the bony, tendinous and cutaneous planes and can be the site of pathology

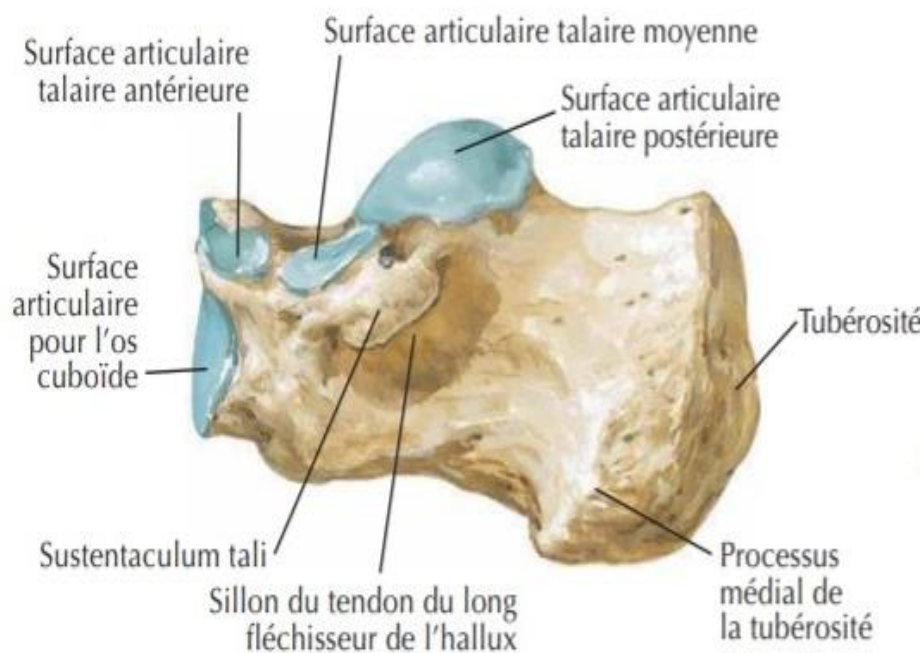


Figure 1. Medial view of the calcaneus (NETTER F.2015)

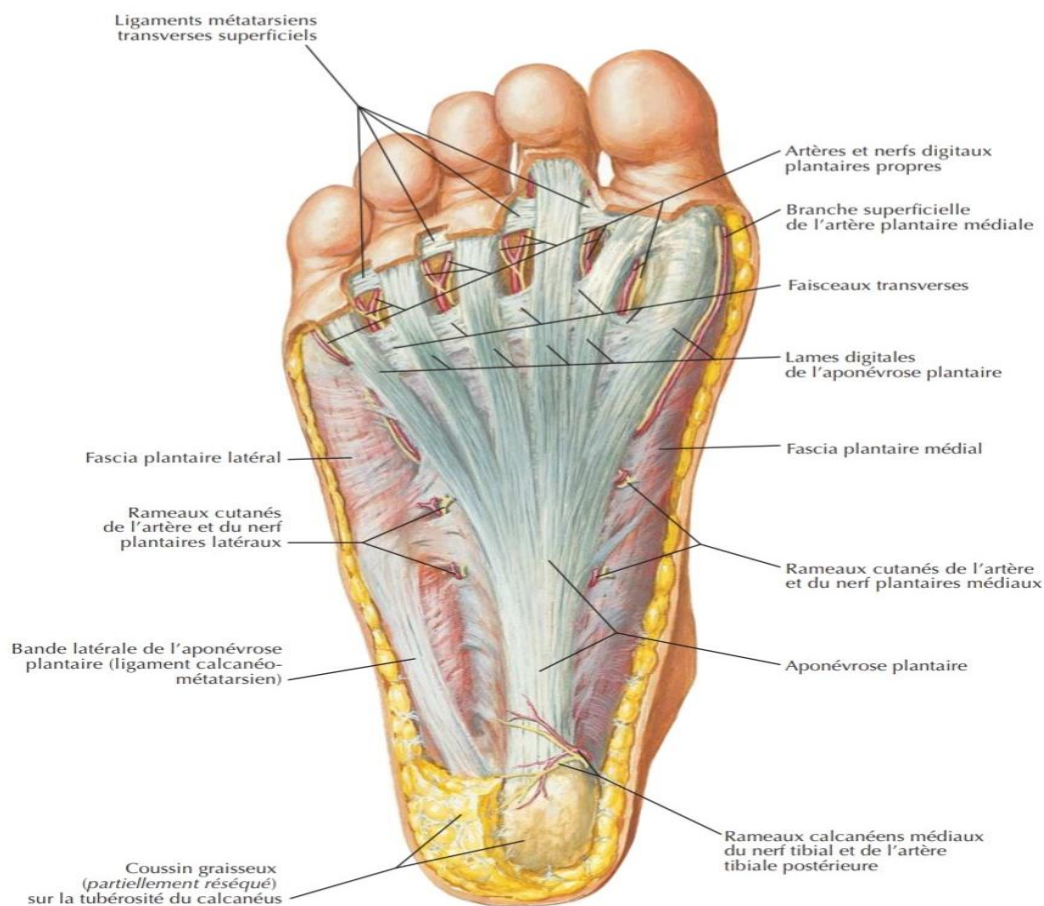


Figure 2. Plant of the foot: superficial dissection (NETTER 2015).

**Clinical diagnosis**

The diagnosis as well as the etiological approach are based first of all on the questioning.

**The interrogation allows us to clarify:**

- The site of pain: located at the heel and thus eliminating pain in the forefoot; referred pain; calcaneal tendon pain

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- Time of occurrence: presence or absence of a nocturnal, daytime or mixed timetable.
- History: inflammatory rheumatic pathology (rheumatoid polyarthritis; axial ankylosing spondylitis; rheumatic psoriasis); other rheumatological pathology such as osteoporosis; degenerative pathology such as osteoarthritis; diabetic neuropathy.
- Associated signs: sciatica; lameness of the lower limbs; lower back pain; skin signs.
- Circumstances of occurrence: during a sporting activity; when walking; at rest ; following trauma
- Mode of onset: brutal; insidious or progressive.

### PHYSICAL EXAMINATION

On inspection we look for the presence of edema; swelling or deformation. We look at the appearance of the skin for signs of inflammation (shiny skin). We also inspect the patient's shoes for pressure points or asymmetry at the heels and a analysis of the statics of the feet will be carried out. The study of walking with and without shoes will be carried out. Palpation of the heel looking for subcalcaneal swelling; bidigital palpation consists of pinching the lateral surfaces of the calcaneus between the thumb and index finger in search of provoked pain; loading on the tip of the heel with bi- and unipodal hopping tests the calcaneal tendon.

An exhaustive examination of the joints of the lower limbs will be carried out bilaterally and symmetrically (hips, knees, ankles); We will systematically look for abnormalities in the morphotype of the lower limbs.

### PARACLINICAL DIAGNOSIS

#### Biology:

We will look for a biological inflammatory syndrome resulting in an increase in the sedimentation rate and an increase in C-reactive protein. However, an inflammatory etiology of heel pain may not be accompanied by an elevation of these so-called markers of inflammation.

A search for the HLA B27 antigen is requested in search of etiological arguments in favor of spondyloarthropathy.

#### Imaging:

##### Standard x-ray:

X-rays of the heels from the front and in profile under load allow us to direct ourselves towards bony etiologies; calcifications or to diagnose a fracture of the calcaneus.

Ultrasound of the ankle is useful for studying soft tissues; it will allow us to study the plantar aponeurosis; enthesopathies and bursitis.

##### CT scan:

Imaging examination is effective in detecting small fractures missed by standard radiography as well as bone tears.

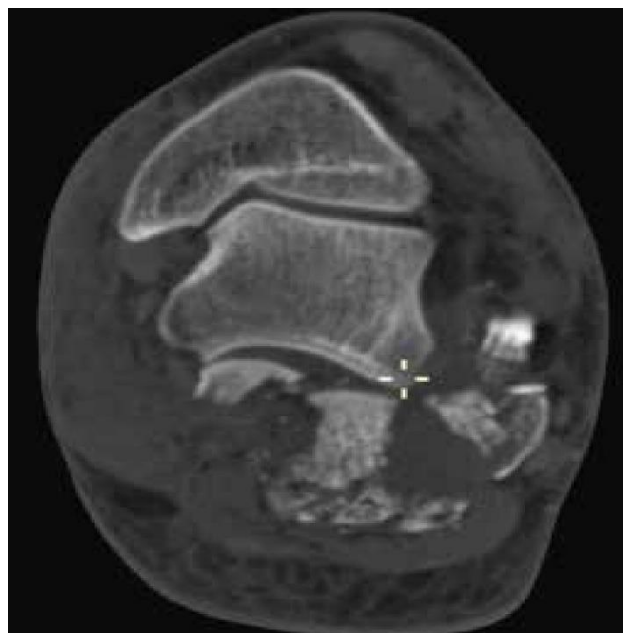


Figure 3. Coronal CT section of a Sanders II calcaneus fracture (RAZIK A, HARRIS M, TROMPETER M.2018).

#### Magnetic resonance imaging:

This examination allows us to study soft structures such as the plantar aponeurosis; the entheses but also the bones.

### FUNCTIONAL ASSESSMENT

The purpose of the functional assessment of the patient is to determine the deficiencies; to look for activity limitations and participation restrictions while analyzing contextual factors.

#### • Assessment of deficiencies

This is essentially the assessment of pain; we can help ourselves in this sense with pain assessment scales (visual analogue scale; cued visual analogue scale). For neuropathic pain we can use the DN 4 questionnaire (annex 2).

#### • Assessment of activity limitations

This assessment uses validated tests such as the six-minute walk test; the modified FAC test (Functional Ambulation

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Categories) which is a 06-point scale which assesses the patient's mobility by determining the need for human assistance when walking.

### • Evaluation of the participation restriction

The latter is based on the assessment of quality of life; the socio-professional impact through non-specific pathology questionnaires such as the SF-12; the SF-36.

The Sickness Impact Profile is used to measure the effect of illness on physical and emotional functioning.

## ETIOLOGIES AND MANAGEMENT

### Talalgia of inflammatory origin: Talalgia of spondyloarthropathy

Talalgia is a frequent reason for consultation in patients with spondyloarthropathy (DAMIANO 2007); they are manifested by inflammatory damage to the entheses which correspond to the areas of insertion of tendons and ligaments on the calcaneus. Spondyloarthropathies (ankylosing spondylitis; reactive arthritis; psoriatic arthritis; rheumatism of inflammatory bowel diseases and SAPHO syndrome) bring together a group of pathologies which have in common the presence of the HLA-B27 antigen and joint inflammatory manifestations and extra-articular (EL HASSANI S and al. 2002) During rheumatoid arthritis, heel pains are much rarer; they may be related to bursitis, more often retrocalcaneal or referred to the heel from arthritis of the ankle ([BEN TEKAYA A 2021, AKASBI N, TAHIRI L, HARZY T. 2009). Two classification systems have been developed taking into account heel pain as diagnostic criteria for spondyloarthropathies. These are the AMOR criteria (AMOR B and al.1990) and those of the European Sponlyarthropathy Study Group (ESSG) (DOUGADOS M, and al. 1991).

Talalgia is therefore a commonly found symptom; Abba et al found out of a total of six hundred and forty-seven collected cases of ankylosing spondylitis an enthesal impairment of 46.67% manifested by heel pain. (ALBA A , 2021).

Medicinal treatment consists of the administration of analgesics such as non-steroidal anti-inflammatory drugs; paracetamol and opioids. However, this treatment remains insufficient and physical treatment must be combined with it. The latter includes health and diet measures with weight loss if necessary; rest during painful phases and resumption of regular physical activity during calm phases.

An adaptation of the footwear can be offered to the patient as well as the making of a plantar orthosis.

Motor rehabilitation includes performing analgesic massage; a stretching of the posterior suro-calcaneo-aponeurotic chains; strengthening of the intrinsic muscles of the foot and triceps surae.

### TALALGIA OF MECHANICAL ORIGIN

#### • Plantar insertional myoaponeuritis

It is the most common cause of heel pain (GOFF JD, CRAWFORD R 2011); it is much more common than heel pain of inflammatory origin, classically the pain is located on the underside of the heel. This pathology is favored by architectural defects of the foot; overweight and also professions that require prolonged standing.

The diagnosis is clinical and on the x-ray of the heel we can note a subcalcaneal enthesopathy with a homogeneous, well-limited mechanical appearance without bone erosion; it is not the cause but the consequence of the disease (DAMIANO 2007) (figure 3).

On the ultrasound of the heel we can note a thickening of the wall of the aponeurosis (which will be greater than 04 mm) hypoechoic; with blurred edge. On magnetic resonance imaging, the aponeurosis is thickened, poorly defined, with hypersignal on T2 and STIR.

Therapeutic options are diverse, however analgesics, particularly NSAIDs, are still not enough to relieve the symptoms. The basis of treatment includes reducing the weight load in the event of overload noted. Wearing a plantar orthosis gives excellent results from a functional point of view; they are the basis of treatment.

Corticosteroid infiltration can be carried out in addition and repeated one week apart if the first injection was not effective (no more than three in total); this infiltration can be ultrasound-guided or under anatomical identification by palpation; the needle is inserted in front of the heel support area laterally; medial or plantar.(2005)

The physical treatment includes a series of exercises to be carried out by the patient for at least three months. This weight-bearing strengthening program was first proposed by RATHLEFF and AL (2014); It includes concentric and eccentric heel raise exercises.

Physical treatment may also include shock wave treatment with variable results in combination with other therapeutic modalities.( JELASSI O, BENZARTI S, JRIRI S 2021)

In the event of failure of medical treatment which reflects the persistence of pain, surgical treatment may be offered. (NEUFEL K K ET AL2008)

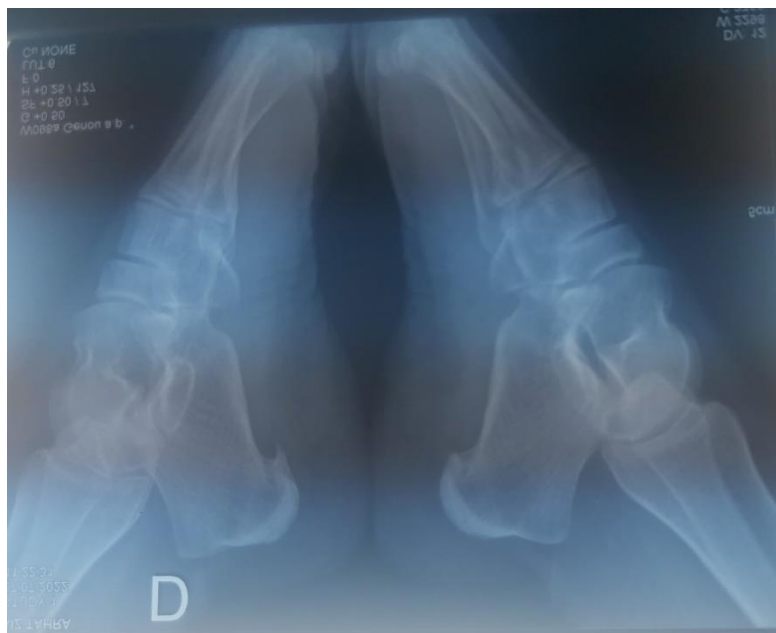


Figure 4. Heel spur at the insertion of the calcaneal tendon



Figure 5. Shock wave treatment of plantar myoaponeurosis.

• Haglund's disease

It is a pathology linked to an achilo-calcaneal conflict; it manifests itself by pain in the rear foot of mechanical origin which is the result of a foot-shoe conflict linked to a morphological anomaly of the postero-superior tuberosity of the calcaneus with inflammatory retro-calcaneal and pre-achilleal bursitis and Achilles tendinopathy (CHAUVEAUX D.1994)

Clinical examination and x-ray of the heel as well as ultrasound are sufficient to make the diagnosis. Questioning reveals pain in the forefoot which is non-specific; the profile heel x-ray under load confirms the prominence of the forefoot if it exists and confirms the prominence of the postero-superior angle of the calcaneus. Ultrasound reveals pre- or retrocalcaneal bursitis with a thick and hypervascularized wall on color Doppler. (ADIGO AM,2015)

Medical treatment is based on the administration of non-steroidal anti-inflammatory drugs systemically and the infiltration of corticosteroids locally; local mesotherapy treatments can also be carried out. Rehabilitation (physical treatment) is optimized on transverse massage; stretching of the posterior chains and gastrocnemius that the patient must carry out in self-rehabilitation for at least 20 minutes per day and the use of ultrasound and cryotherapy.

Surgical treatment is based on simple resection of the tuberosity of the calcaneus (JARDE O.1997)

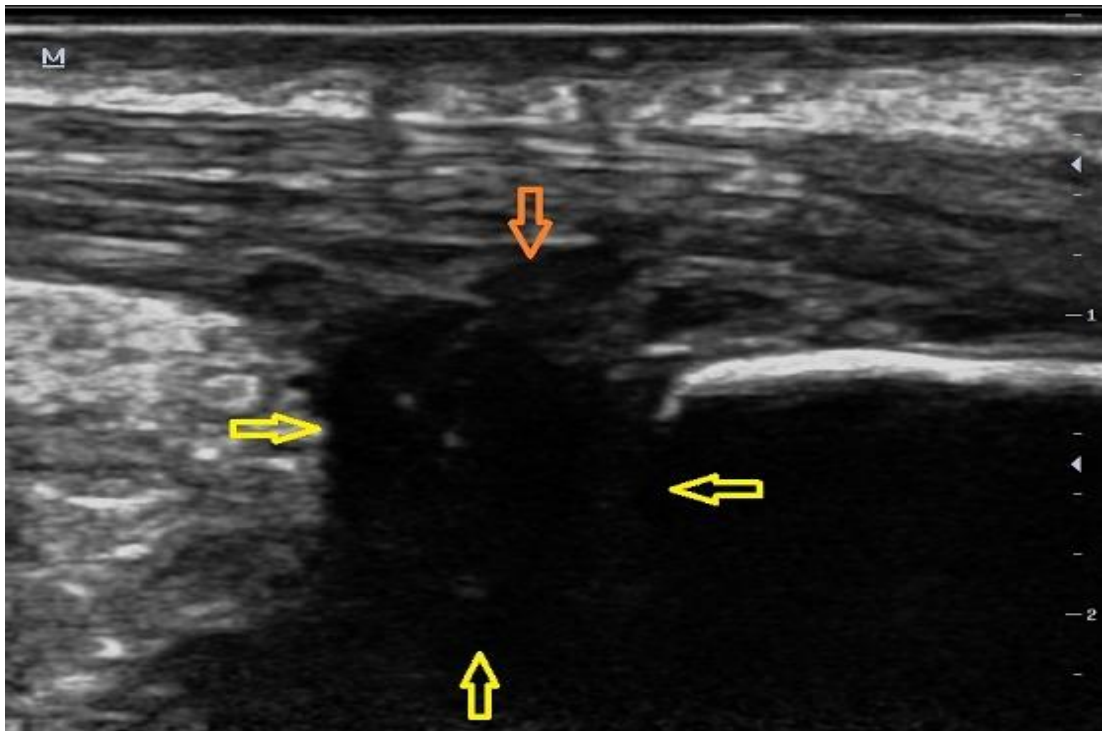


Figure 6. Ultrasound appearance of anechoic pre-Achilles fluid effusion related to pre-Achilles bursitis (yellow arrow) associated with a rupture of the anterior fibers of the tendon (orange arrow). (ADIGO AM,2015)



Figure 7. Ultrasound treatment of Haglund's disease.

• Insertional calcaneal tendinopathy

This pathology manifests itself as pain at the calcaneal insertion of the tendon; diagnosis is based on magnetic resonance imaging; a physical treatment including muscle strengthening and stretching as well as wearing a heel lift will be prescribed to the patient in addition to the usual analgesic treatment in the case of conservative management.

**Paracalcaneal bursopathy**

The bursae present between the face of the heel and the skin can be the site of inflammation. The treatment is essentially based on resting the heel; application of local treatments such as icing; The use of an orthopedic insole reduces the pressure exerted on the heel.

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### Talalgia of neurological origin due to ductal syndrome.

They should be differentiated from referred heel pains during lumbo-radicular pain; it may be compression of the medial calcaneal nerve or the nerve of the abductor of the fifth toe muscle. Palpation of the talent may reveal burning or tingling pain. The diagnosis is confirmed by magnetic resonance imaging.

Support includes possible correction of the static fault and local treatment by infiltration.

Neurolysis surgical treatment is only considered in the event of failure of medical treatment.

### Other etiologies of heel pain

Acute post-traumatic heel pain (rupture of the plantar aponeurosis) and heel pain observed during bone pathologies require resting the heel. The treatment is carried out jointly with the trauma specialist. From the point of view of physical medicine and rehabilitation, the assessment of deficiencies is a necessary prerequisite for any rehabilitation program; in order to limit the socio-professional impact of the pathologies in question.

### CONCLUSION

Talalgia is pain in the back of the foot; they are responsible for a functional limitation, particularly walking and standing. They are essentially of mechanical origin and rehabilitation occupies a key place in the patient's care and is dictated after a rigorous functional assessment of the patient

**Conflict of interest: none.**

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## Annex 1

### QUALITY OF LIFE QUESTIONNAIRE: SF-12

Pre-treatment  Post-treatment

FAMILY NAME:

First name:

DATE:

The “Medical Outcome Study Short Form 12” (MOS SF-12) or “Short Form 12” (SF-12) is a scale for self-evaluating quality of life. It is a shortened version of the SF-36. The following questions are about your health, as you perceive it. If you don’t really know how to respond, choose the closest answer to your own situation.

1. On the whole, do you think your health is:

1 Excellent 2 Very good 3 Good 4 Mediocre 5 Bad

2. In terms of your current state of health, are you limited when it comes to:

moderate physical exercise (moving a table, vacuuming, playing boules etc.)?

1 Yes, very limited 2 Yes, a bit limited 3 No, not at all limited

climbing the stairs for several floors?

1 Yes, very limited 2 Yes, a bit limited 3 No, not at all limited

3. During the past 4 weeks, and in terms of your physical state:

have you achieved fewer things than you would have liked?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

have you been limited in doing certain things?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

4. During the past 4 weeks, and in terms of your emotional state (like feeling sad, nervous, or depressed):

have you achieved fewer things than you would have liked?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

have you found it difficult to do things with as much care and attention as usual?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

5. During the past 4 weeks, to what extent has your physical pain limited you in your work or your activities at home?

1 Not at all 2 A little bit 3 Moderately 4 A lot 5 A huge amount

6. The following questions are about how you have felt over the last 4 weeks. For each question, give the answer which seems to you to be the most appropriate.

have there been times when you have felt calm and relaxed?



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1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

have there been times when you have felt bursting with energy?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

have there been times when you have felt sad and defeated?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

7. Over the last 4 weeks, have there been times when your physical or emotional state of health has had a negative effect on your social life and your relationships with others, such as your family, friends and acquaintances?

1 Always 2 Most of the time 3 Often 4 Sometimes 5 Never

### Annex 2: DN4 questionnaire

## DN4 – QUESTIONNAIRE

To estimate the probability of neuropathic pain, please answer yes or no for each item of the following four questions.

INTERVIEW OF THE PATIENT		
<b>QUESTION 1:</b>		
<b>Does the pain have one or more of the following characteristics?</b>	<b>YES</b>	<b>NO</b>
Burning .....	<input type="checkbox"/>	<input type="checkbox"/>
Painful cold .....	<input type="checkbox"/>	<input type="checkbox"/>
Electric shocks .....	<input type="checkbox"/>	<input type="checkbox"/>
<b>QUESTION 2:</b>		
<b>Is the pain associated with one or more of the following symptoms in the same area?</b>	<b>YES</b>	<b>NO</b>
Tingling .....	<input type="checkbox"/>	<input type="checkbox"/>
Pins and needles .....	<input type="checkbox"/>	<input type="checkbox"/>
Numbness .....	<input type="checkbox"/>	<input type="checkbox"/>
Itching .....	<input type="checkbox"/>	<input type="checkbox"/>
EXAMINATION OF THE PATIENT		
<b>QUESTION 3:</b>		
<b>Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?</b>	<b>YES</b>	<b>NO</b>
Hypoesthesia to touch .....	<input type="checkbox"/>	<input type="checkbox"/>
Hypoesthesia to pinprick .....	<input type="checkbox"/>	<input type="checkbox"/>
<b>QUESTION 4:</b>		
<b>In the painful area, can the pain be caused or increased by:</b>	<b>YES</b>	<b>NO</b>
Brushing? .....	<input type="checkbox"/>	<input type="checkbox"/>

**YES = 1 point**  
**NO = 0 points**

**Patient's Score:        /10**