SPENTYS

APPLICATION NOTE

3D printed braces as a replacement for traditional Jaccoud's Hand

Introduction

Jaccoud arthropathy (JA) is a deforming, non-erosive arthropathy characterised by ulnar deviation of the second to fifth fingers with metacarpophalangeal (MCP) joint subluxation. The toes can also be affected by JA.

JA was initially described as a complication of recurrent rheumatic fever. Later on, it was reported in association with several rheumatic and non-rheumatic disorders, such as systemic lupus erythematosus and other connective tissue diseases, psoriatic arthritis, inflammatory bowel disease and malignancy.

Pathology: imaging technology

Plain radiograph

Hand radiographs typically show marked ulnar subluxation and deviation at the MCP joints.

Absence of erosions is a notable feature, although occasionally "hook" erosions can be observed, which are similar to those seen in Lupus (SLE) and ankylosing spondylitis (AS).

Evidence of muscle (soft tissue) atrophy may also be present.

Classification

A limitation on the study of JA is the lack of definite diagnostic or classification criteria. Previous attempts to classify JA were made based on the presence of "reversible deformities" and absence of erosions on X-rays and rheumatoid factor negativity or as "any deviation of the metacarpus finger axes assessed by a goniometer". Spronk et al. developed a diagnostic "index" which allowed for the presence of different deformities and attributing JA a score of over five points. None of these sets of criteria has achived universal acceptance.

Jaccoud's hand

Jaccoud's hand

Old school solution

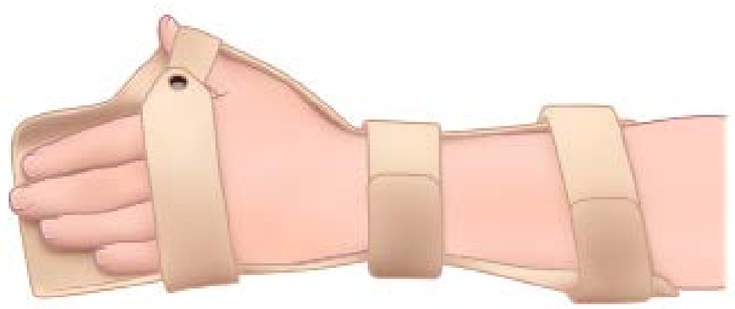
Treatment focuses toward alleviating pain and maintaining functionality of the affected joints through use of nonsteroidal anti-inflammatory drugs, corticosteroids, antimalarial drugs and physiotherapy. Methotrexate is the current mainstay of therapy.

Surgery is also a possibility, with osteotomy or stabilization with Kirschner intramedullary wire. Tendon relocation, however, has been shown to only work in 30% of cases.

Shortfall of old school solution

The traditional method does not take into account the needs of the patient. The treatment can only be done at night because the patient cannot wear a brace during the day. No account is taken of the evolution of the pathology.

Therefore, these traditional methods often impose unnecessary patient suffering. While not offering the correct treatment for Jaccoud 's Hand, it's also apparent that the comfort level of the patients is set back severaly by the pathology.



Traditional cast

vs.

Spentys solution

3D Printing as a solution for JA

While traditional methods only offer limited solutions, 3D printing has proven to be a rapid, highly customisable and secure solution for JA.

Spentys is recognized as a trusted clinical partner and full solution provider for all non-invasive immobilization and functional orthopedic treatments. The European Spentys® network brings together, paediatricians, orthopaedists, surgeons, neurologists, physical therapists and osteopathologists to provide a perfect interdisciplinary care for the youngest of patients. Close cooperation with renowned university hospitals both nationally and internationally provides easy access to the latest research and scientific findings which are constantly being integrated into Spentys®development work.

Advantages:

The Spentys PolyCast is used to improve, on one hand the bandagists' daily work and on the other hand the quality of life of patient.

Implement the bandagist's expertise:

Thanks to the 3D scan of the patient's limb, Spentys is able to replace and recreate the articulations of the limb. These virtual articulations can then be step-by-step adapted throughout the whole healing process. It makes the healing process way more precise and stable. It helps to gather accurate anatomical data.

Improve the patient's quality of life:

The PolyCast is comfortable thanks to great printing quality (production). It is X-Ray transparent, easy to apply alone (self-adhesive straps), aerated and waterproof. The splint is hygienic and can be washed to keep it clean and pleasant. The PolyCast is thin (3.5mm width) and light (100gr), while being rigid and resistant enough to immobilize and support the patient's limb. Because the Polycast is tailor-made, the daily needs of the patient can be taken into account. If the patient works a lot with the computer in his daily life, the Polycast can be adapted to this by adjusting the dimensions and/or using flexible materials instead of hard materials. This ensures that the treatment of the pathology can also be continued during the day.

How does it work?

1. Scan the injured limb

By 3D scanning the patient's limb, you will obtain its perfect dimensions, considering all specific morphologies.

2. Digital modeling of the brace

Thanks to our algorithms and the expertise of medical professionals, Spentys solution will automatically 3D model the tailor-made immobilization device.

3. 3D printing of the brace

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"I believe that 3D technologies represent opportunities for the orthopedic world and Spentys develops tools that we as medical professional can use to make a difference."

Dr. Marc Elbaum, orthopedic surgeon - Chirec, Belgium

Recyclable Waterproof Lighter Adaptable Less hindering Aerated

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3D printed braces as a replacement for traditional clubfeet cures

Step-by-step methodology:

1 Scan the injured limb

By 3D scanning the patient's limb, you will obtain its perfect dimensions, considering all specific morphologies.

2 Digital modeling of the brace

Thanks to our algorithms and the expertise of medical professionals, Spentys' solution will automatically 3D model the tailor-made immobilization device.

3 3D printing of the brace

Our reliable and efficient 3D printers ar then usde to produce your tailor-made orthopaedic device.

Set up a proof-of-principle with us:

Step 1: Submit your design request

Step 2: Our project team sets up a meeting to discuss

Step 3: We develop and 3D print the design request

Step 4: We send you the 3D printed cast

Submit design request here or book a demonstration at www.spentys.com