



Dynamic Progressive Orthosis for Elbow Flexion Contracture

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Abstract:

Dynamic progressive orthosis is the type of mobilization orthosis that therapist use to help their clients regain passive motion in stiff joint and tissue. This type of orthosis with non-elastic components to apply force to the stiff joint or tissue, holding it at end range position to improve passive motion. The Patient is instructed to increase the force as the joint or tissue accommodates a new end-range position over time. In these manner, static progressive orthosis permits progressive changes in tissue position. Conservative treatment options for elbow contracture can successfully treat most elbow contractures of less than 6 months' duration. These options will be based on your situation and may include Physical Therapy, Orthotic Intervention and Serial Plaster Casting.

Keywords: Progressive Orthosis, Elbow flexion contracture, Rehabilitation therapy, Plaster mold, Plastic molding.

Introduction:

As one of the most common musculoskeletal complications following trauma, elbow contracture is a frequent source of disabled daily activities. Due to the multitude of etiologies, the incidence of elbow contracture after trauma and surgery which requires surgical treatment. Posttraumatic elbow contracture may result from both intrinsic and extrinsic factors. The intrinsic causes include intra-articular adhesions, articular malalignment, loss of articular cartilage, and a combination of the above, while the extrinsic causes contain capsular and ligamentous contracture, heterotopic ossification, extra articular malunions, and soft-tissue contractures following burns. Among those factors, capsular and soft-tissue contractures are considered the main causes of elbow contracture. Recent reviews, however, suggested that most of elbow contractures are caused by a combination of both intrinsic and extrinsic factors. More importantly, pain and swelling after trauma or surgery play an essential role in promoting the formation of contracture.

Methodology:

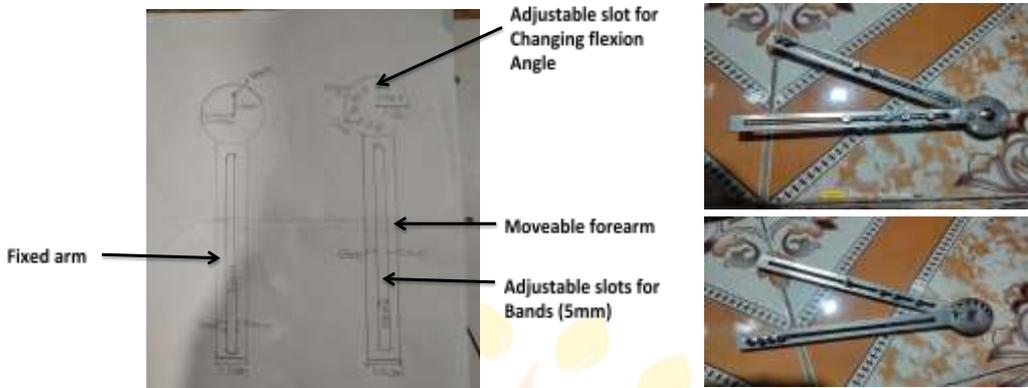
Linear measurements for Arm length, Forearm length were noted. Circumferential measurements around maximum, minimum level of Arm and forearm recorded. In fabrication process for making arm and forearm shell negative of the Plaster of Paris 4 inches bandages were used to plaster cast. Positive of it prepared with appropriate modifications. For fabrication of elbow unit is done by using steel round shaped dials which is then attached with uprights and holes are made at equidistance level to have different locking positions in it.





Fig. Fabrication procedure of Dynamic Progressive Orthosis for Elbow Flexion Contracture

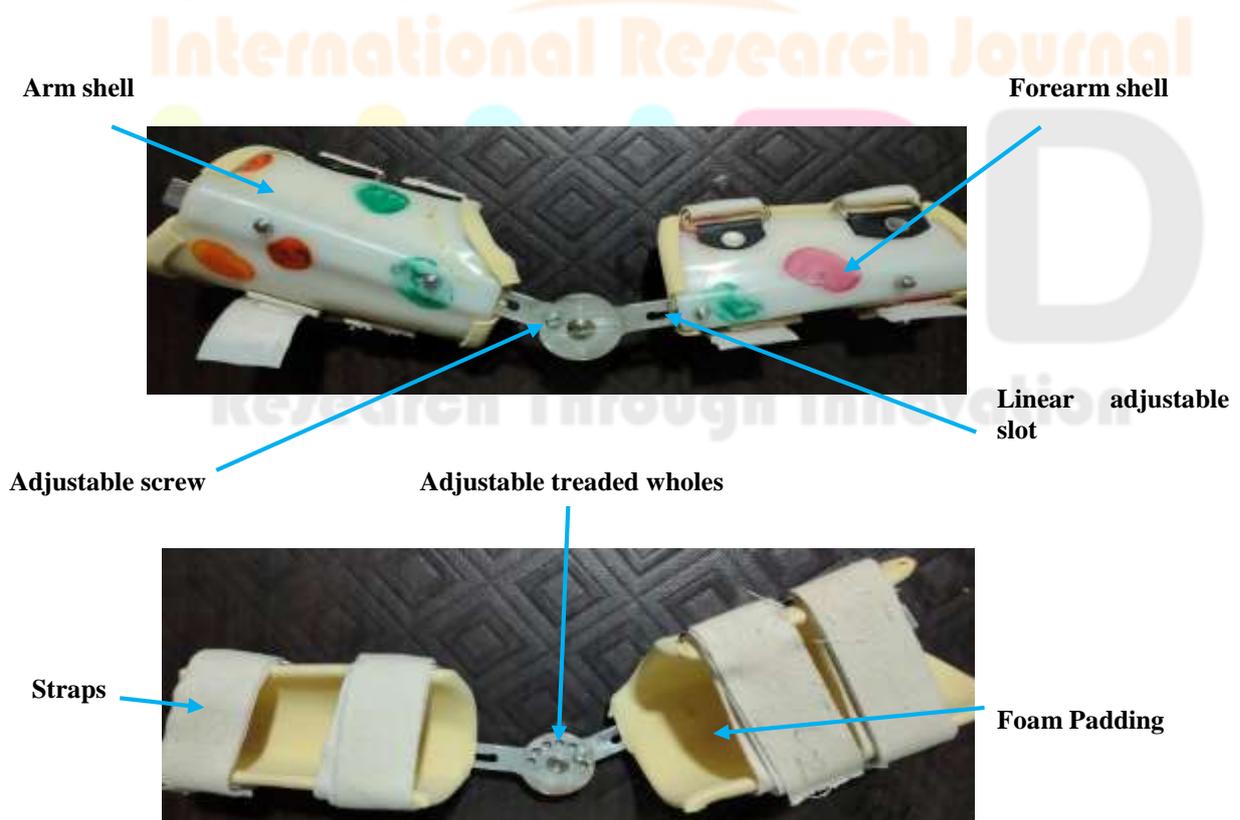
Design of the Orthosis-



Key Features and functions of Dynamic Progressive Orthosis for Elbow Flexion Contracture:-

Non-elastic component places tension on stiff joint/tissue to hold at its maximum tolerable length. Adjustments to the tension on elbow joint can be made by the patient easily. The orthotic design maintains the shortened tissue at its maximal tolerable length and does not stress beyond it. It is very important not to exceed the maximal tolerable stress level, which could lead to tissue failure. The longer the tissues remains at its maximum tolerable length, the more it increases in length. This concept is known as total end range time (TERT). Success can be measured by small gains of perhaps 5–10 degrees a week. Improved range of motion without pain. The patient is able to adjust the tension force gradually, as this type of orthotic intervention takes advantage of small incremental changes in tissue length. The optimum orthotic design allows for small changes in joint motion without remolding of the orthosis each time gains in range of motion are accomplished. It hold elbow in new flexion angle and reduce flexion contracture progressively 5-10degree / week.

Final Prototype of Dynamic Progressive Orthosis for Elbow Flexion Contracture



Patient having 100degree flexion contracture of elbow joint



- Contracture is passively reduce with the help of adjusting flexion angle by using Dynamic Progressive Orthosis



- It hold elbow in new flexion angle and reduce flexion contracture progressively 5-10degree / week

Results: This Dynamic Progressive Orthosis for Elbow Flexion Contracture is found to be effective in treating elbow joint contractures passively and progressively. Static elbow orthosis are need to be replaced in certain interval of time but this Dynamic Progressive Orthosis for Elbow Flexion Contracture Orthosis can readjusted gradually under the Orthotist or Therapist or well educated caretaker.

Discussion: Dynamic Progressive Orthosis for Elbow Flexion Contracture is an innovative solution for the rehabilitation of Elbow Flexion Contractures which can be conservatively treated. Tis orthosis is easy to use and gives significant results while using for patients. With further more research the electronic version of the device can be developed.

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