

## WOLFF'S LAW

Participation in a weight bearing program incorporating the use of a standing frame is often included as part of the therapy program for children/youth with cerebral palsy GMFCS level IV and V. It is well known that mechanical loading through muscle tension and weight bearing loads are important to build and maintain bone density; however the evidence supporting weight bearing programs in children with cerebral palsy as a means to improve bone mineral density (BMD) is not clear. The optimal parameters to improve BMD through a weight bearing program is unknown, but available research findings would suggest **60-90 minutes daily, 5 days a week** can positively affect BMD. Further research to measure dose and response is needed.

## WEIGHT BEARING PROGRAM F.A.Q.s

### WHO should participate in a weight bearing program incorporating a standing frame?

All children and youth with physical disabilities that have, or are at risk for, decreased bone density. This includes clients with a diagnosis of cerebral palsy, GMFCS levels IV and V.

### WHEN should a weight bearing program incorporating a standing frame be initiated?

Ten to 14 months of age based on the premise typically developing children begin pulling to stand at eight to nine months of age and begin standing and taking their first few steps by approximately 12 months.

It is important for children with physical disabilities to begin standing around the same timeframe as their peers.

### WHAT types of standing frames are available?

There are three basic standing frame styles – vertical/upright, supine and prone

**Vertical stander** - the client is positioned upright in the frame. A variation of the vertical stander is the sit-to-stand frame in which the client is transferred into the standing frame in a seated position and brought to an upright position within the limits of their tolerance.



**Prone stander** - the support surface is in front of the client. The client is positioned in upright or with slight forward tilt.



**Supine stander** - the support surface is behind the client. The client is positioned supine on the frame and then tilted as far upright as possible to within the client's tolerance.

Standing frames have a variety of features and accessories to support the client and optimize alignment such as head rests, trunk laterals and straps, activity tray, hip prompts/pads/straps, pommel, knee blocks, and footplates. Depending on the specific stander the knee blocks and footplates can be independent of one another to accommodate for asymmetries in alignment such as contractures and leg length discrepancies.

## What factors should be considered when selecting the most appropriate style of standing frame?

### 1. CLIENT CONSIDERATIONS:

#### **Postural control:**

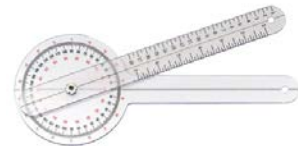
Does the client have antigravity head control? If the answer is no, this would guide you towards a supine stander so the head and neck would be adequately supported. If the answer is yes you may consider a prone or vertical frame.

Does the client have good core activation and fair antigravity postural control? If yes then a vertical stander may be considered.

If the client has marked limitation in trunk control then a supine or prone stander would be more appropriate.

#### **Range of motion:**

Are there flexion contractures at the hips, knees or ankles?



If the client presents with contracture it may not be possible to position them in a basic vertical stander. A sit-to-stand, supine or prone stander may be more suitable. The sit-to-stand frame moves the client from a position of hip and knee flexion into extension and can be stopped at any point depending on the client's flexibility or comfort.

A stander with independent knee blocks and footplates is appropriate for the clients with asymmetrical contractures and/or leg length discrepancies.

AFOs are recommended for use in the stander to help improve foot contact and protect ankle and foot alignment. Angle adjustable footplates are available to accommodate for ankle plantarflexion contractures.

Client comfort and tolerance in the standing frame, as well as the activity they wish to participate in while in the stander are other important factors to consider.

## 2. CAREGIVER CONSIDERATIONS:

### *Ease of transferring the client into the standing frame*

Depending on the client's age and mobility status the amount of assistance to transfer the client into the frame may range from:

- Walking the child into the frame with assistance (vertical)
- Lifting the child into the frame (supine, prone, vertical)
- Performing a standing pivot transfer (sit-to-stand)
- Using a mechanical lift system (supine) Note: If using a hoist you need to make sure the hoist lift fits around or under the base of the standing frame

### *Ease of positioning the client properly in the standing frame*

It is best to trial the standing frame in the home for a week or two to see if any issues arise regarding client comfort, ease of transfers and positioning.

## 3. SPACE CONSIDERATIONS:

At school or at home, space to use the stander and store the stander can be a factor

## 4. COST CONSIDERATIONS:

There is a range in prices, the more basic the frame the less costly. Funding agencies may approve funding support for one manufactured frame but not another.

## How much weight does the client bear when in the stander?

On average client's bear 76% of their body weight when positioned in a standing frame, but there is a large range, and differences exist between standing frames. There may be less effective loading of the legs if positioned in hip and knee flexion secondary to contractures. Position the client in as close to neutral hip and knee extension within the limits of their comfort. The inclination/tilt of the standing frame is not a significant factor of weight borne if the tilt is 70 degrees or more upright.

A force plate or scale may be mounted to some footplates. In general a caregiver should not be able to move the foot once the client is positioned in standing.

## What are the contraindications to using a standing frame?

Current fracture unless medical clearance has been given, post-operative weight-bearing restrictions, pain associated with standing in the standing frame (due to hip subluxation or dislocation, excessive soft tissue stretch, excessive pressure).

Hip subluxation or dislocation in the absence of pain is not a contraindication.

## What are some general guidelines on how to implement a weight bearing program?

Gradually increase the amount of time the client is positioned in the frame when introducing the standing frame. Begin with what the client is able to tolerate at the outset. If the client is able to tolerate 15-20 minutes, try building by 5 minute increments every few days until they reach 60 minutes of standing. If the client is unable to tolerate standing for the whole duration or this is not possible given daily routines and activities, break the time into shorter 20-30 minute segments. If the plan is for the client to be positioned in the stander for 90 minutes per day, break it down into two 45 minute sessions to prevent fatigue. The client may have the opportunity to spend time in a standing frame at school and at home.



Check the client's skin after taking them out of the standing frame paying particular attention to areas of higher pressure contact (e.g. knee blocks).

While in the standing frame it is important for the client to be engaged in an activity, and built into a routine when possible.

### Key References

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