

## Effects of a new dynamic head suspension device in feeding people with loss of head control.

### Authors:

Mónica Arroyo Noriega. OT

Lourdes Lopetegui Jaunsarás. Medical Doctor at Centro Ramón y Cajal. Aspace Navarra. Spain

### Abstract

Presenting the results of a research on the posture of five multi-disability subjects that were studied during feeding time. All of them had bad head control, comparing the basal position with the one obtained using the new head support device called Headpod<sup>®</sup>. The results show the benefits that this new therapeutic tool can provide to both the users and caretakers.

People with cerebral palsy, and also those presenting other types of disabilities, have quite often postural control problems making difficult swallowing and feeding.

For this reason the adequate position and head and neck alignment has been accepted as the objective in the treatment of oral-motor disfunctions.

According to Ogg (1975), the most important motor function related with feeding is the control of the head and neck.

To achieve this objective, they have been using devices that block the head movement adapted to chairs, associated with the reclining of these chairs.



## Introduction

People with cerebral palsy or with other kinds of disabilities, often have problems with the position control which make the deglutition and feeding more difficult. For this reason, the correct position and lining up of the head and trunk have been accepted as an objective in the treatment of the oral-motor control dysfunctions.

According to Ogg (1975), the most important motor function relation to the feeding is the head and neck control. To achieve this objective, some devices which block the head movement have been used, adapted to the wheelchairs but always associated with the inclination of those wheelchairs.

The objective of this study is to test the effect of this new head suspension device, which is a dynamic support and make easier the line-up of the head and neck without limiting the rotation movements during the meal times or other activities for disabled people.



## Methodology

### Subjects of the study:

The inclusion criteria for this prospective research was of people under 30 years old with multi-disabilities that assist regularly to the ASPACE's Ramon y Cajal Cente in Navarra, Spain and that were in need of head support by his caretaker during feeding time due to lack of head control. They were excluded those with osteoarthritis or muscular contractures in the neck, also those with serious kyphosis or scoliosis.

The subjects of study were 5 persons, aged between 8 and 26 years, with many disabilities and that attend daily to the Ramón y Cajal ASPACE Center in Navarra. Two brothers have a deep mental retardation /alpha-thalassemia linked to X for ATRX mutation, another one has a trisomy 15 with a deep mental retardation and a generalized epilepsy, the fourth one has an epileptic encephalopathy with deep mental retardation and finally the last one has a dystonic cerebral palsy with secondary epilepsy. No one has a head or trunk control while seated and they were not able to eat and drink by their own.

### Device: Headpod ®

It is a suspended device, installed in the headrest which keeps the head of the patient in an upright position and permits the rotation of the head, limiting the lateral and posterior flexion. (Fig.1)

Headpod ® is specially indicated for kids with bad head position control of the head due to hypotonia on the neck muscles. In adult persons or kids with hypertonia in the muscles of the neck, or any other person that has a serious kyphosis or scoliosis, the success possibilities of success decrease substantially.







Fig. 1 Movements permitted with the use of Headpod

## Measuring:

The study has been made during 10 days, in two consecutive weeks of May 2011 in the Ramón y Cajal ASPACE Center in Navarra. Spain.

During those days, each person was fed with half meal carrying the device and the other half meal without the device, randomizing the order of starting with / without the device, so that at the end of the study each patient would have started 5 days with the device and 5 days without it. The distribution between the different days of the week was made in the way that each patient would have 5 meals starting with the device and 5 meals starting without it

An occupational therapist assessed the elements shown in the Chart 1. Each subject was its own control in comparing the effect of the device.



## Chart 1. Definition of the elements studied during the meals

**Mouth closing:** The patient joins the lips on the spoon, even partially, without bidding it..

**Food sweeping:** sweeps the food with the closure that he can use (lips or teeth) and the food remains in the mouth while taking away the spoon.

**Neck hyperextension:** angulation of the head backwards from the suitable position of vertical continuity between the neck and the head.

**Active swallowing:** makes the movement of swallowing.

**Retention of food while swallowing:** that the food does not go out in general.

**Control of liquids, semiliquids:** joins the lips and leaks as few as possible by the corners.

**Retention of saliva:** determined by the drooling.

**Head and trunk position:** well positioned, lined up and with an upright position.

Moreover, the person who was feeding the patients made another subjective evaluation about the ergonomics of its position and its degree of fatigue, comparing as well the basal situation with respect to the use of the device.

The effect of the device has been studied as well during different activities made by the subjects and that change from one day to another. This evaluation was made by the responsible of such activity.



## Data Analysis

The observations were described comparing the effect with the device with respect to the same situation without the device for each person. The eventual scoring are the following ones: worst/worse/the same/better/much better.

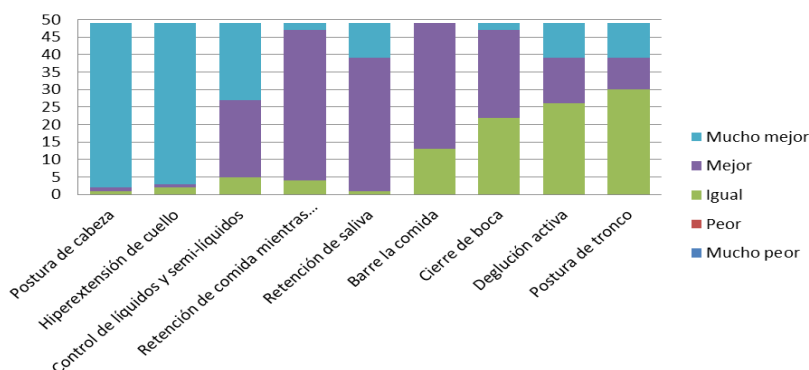
## Results

The results of the effect during the feeding activity are reflected in the Chart 2. The evaluation is made with 49 meals because one person did not eat one day

**Chart 2: Results observed during the feeding activity**

	Much Worse	Worse	Same	Better	Much Better
Head position	0	0	1	<b>1</b>	47
Neck Hyperextension	0	0	2	<b>1</b>	46
Control of liquids and semiliquids	0	0	5	<b>22</b>	22
Retention of food while swallowing	0	0	4	<b>43</b>	2
Retention of saliva	0	0	1	<b>38</b>	10
<b>Food sweeping</b>	0	0	13	36	<b>0</b>
<b>Mouth closing</b>	0	0	22	25	<b>2</b>
<b>Active deglutition</b>	0	0	26	13	<b>10</b>
<b>Trunk position</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>9</b>	<b>10</b>

**Resultados en comidas**



In bold type are indicated the items which results go over 88% once added the “best” and “much better” scoring.

Firstly, we would like to stand out that there was no item that has been evaluated as worst or worse with the use of the device.

Secondly, we have to stand out that the main effect pursued with





the device is the improvement of the head and neck position. Nevertheless, other added beneficial effects have been observed during the study.

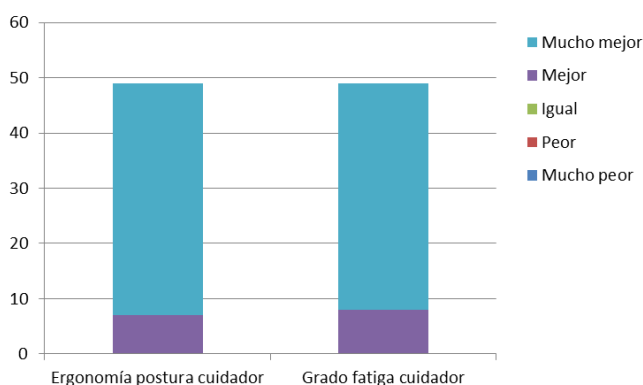
Regarding the other parameters, it was evaluated as better or much better the food (91%), liquids (90%) and saliva (89%)

Even if the difference is not so evident, 73% of the observations made about the item Food sweeping was evaluated as “better” or “much better” with the device. In the rest of the items: mouth closing, active deglutition and trunk position, small differences in favor of the use of the Headpod<sup>®</sup> can be observed.

In the chart 3 we can observe the results of the evaluation made by the workers who gave the meals above the ergonomics of their position while feeding and their degree of fatigue. There were five different persons (one for each subject) which evaluated 49 meals.

**Chart 3: Ergonomics and fatigue of the caretakers during mealtimes**

	Much worse	Worse	Same	Better	Much Better
<b>Caretaker ergonomics</b>	0	0	0	7	42
<b>Caretaker fatigue degree</b>	0	0	0	8	41



The workers gave a very positive evaluation in the improvement of the ergonomics of their position (85% much better and 100% better or much better) and the decrease of the degree of fatigue 83% much better and 100% better or much better).



## Conclusions

A great difficulty was experienced during this comparative research about the feeding in persons with disabilities when finding a group of persons with similar conditions in order to be able to obtain valid data.

The fact that there are few subjects in each center with poor head control during meals, the degree of disability is very often so different and the collaboration cannot be good in the majority of the cases makes very difficult to reach the objective of the research. That is why only five subjects were selected, and this is a limitation.

Despite the limited scope of the subjects, the device studied showed a clear improvement in the position of the head of the user in all the observed feeding maneuvers. The subjective feeling given by the caretakers regarding the ergonomics and accumulated fatigue has been pointed out as very positive for them when using the Headpod<sup>®</sup>.

This study focused on assessing the results during feeding time of the users because it is the moment when data obtaining and comparisons are most easily achieved. It is a daily activity that is makeable by most of these patients with cerebral palsy.

Other activities different than feeding can be also suitable for the use of this therapeutic tool that is already been used to improve the life in multiple activities at home, school or professional in a growing number of users in many countries, being kids with hypotonia the ones that reach most success rates.

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