

**The Effects of a Hippotherapy Simulator in Children  
with Cerebral Palsy**

**Study Protocol with Statistical Analysis Plan (SAP) and  
Informed Consent Form (ICF)**

**January 11, 2018**

**The Effects of a Hippotherapy Simulator in Children  
with Cerebral Palsy**

**Study Protocol**

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**January 11, 2018**

## **Study Protocol**

The study titled "The Effects of a Hippotherapy Simulator in Children with Cerebral Palsy" was approved by the Marmara University Faculty of Medicine Clinical Researches Ethics Committee meeting on 02.09.2016 with approval number: 09.2016.478 (Annex-1).

This study was conducted in "The Private Dilbade Special Education and Rehabilitation Center" between 14.12.2016 and 28.10.2017 with 30 children with spastic Cerebral Palsy (CP) who agreed to participate in the study.

The legal representatives of the children who participated in the study were informed about the aim, duration and the programs to be applied throughout the study. Volunteer Information Form has been signed and approved by the standards deemed appropriate by the Clinical Researches Ethics Committee of Marmara University Faculty of Medicine (This form can be seen on Informed Consent Form (ICF) section). The study was conducted by the Declaration of Helsinki.

### **The hypothesis of the Study**

H0: Addition of the exercises performed with Hippotherapy Simulator (HS) device to the Neurodevelopmental Therapy (NDT) based rehabilitation program in children with CP does not contribute positively in improving the efficiency of gross motor functions, lower extremity functions, muscle tone and spasticity, trunk control, sitting and standing balance, walking functions and functional independence.

H1: Addition of the exercises performed with HS device to the NDT based rehabilitation program in children with cerebral palsy contributes positively to improve the efficiency of gross motor functions, lower extremity functions, muscle tone and spasticity, trunk control, sitting and standing balance, walking functions and functional independence.

### **Randomization of the Study Groups**

Children with CP who received rehabilitation services in "The Private Dilbade Special Education and Rehabilitation Center" were invited to participate in the study. Two different treatment methods were applied to the children who volunteered to participate and met the participation criteria. Rehabilitation programs based on individual NDT were applied to the children included in the study for eight weeks (first group). In the next eight weeks, the HS

system was applied to the same children in addition to individual NDT based rehabilitation programs (study group).

### **Inclusion Criteria**

- Having a diagnosis of Spastic CP,
- Children aged between 5 - 18 years,
- GMFCS level is I, II or III,
- Independent seating,
- Walking with at least 10 meters of independent, orthotic and/or auxiliary device,
- Can understand simple verbal instruction,
- Those with hip adductor muscle spasticity level less than 2 according to MAS,
- Having bilateral passive hip abduction enough to could sit into the hippotherapy simulator device,
- Voluntarily agreed to participate in the study.

### **Exclusion Criteria**

- Those with hip dislocation,
- Severe contracture or deformity to prevent the study,
- Advanced scoliosis (above 20 degrees),
- Acute uncontrolled acute seizures,
- Uncontrollable severe epileptic attacks,
- Visual and auditory problems,
- Injection of botulinum toxin in the last 6 months patients,
- Underwent surgical operation such as muscle relaxation, tendon extension and selective dorsal rhizotomy in the last 6 months.

### **Applied Evaluations**

Evaluations were applied three times: before treatment, after individual NDT programs (at the end of the 8th. week), and after NDT + HS application (at the end of the 16th week). All evaluation data were noted to the "Participant Tracking Form" (Annex-2).

Functional levels of participants were evaluated with the "Gross Motor Function Classification System" (GMFSS). Gross motor functions with "Gross Motor Function Measure-

88” (GMFM-88); lower extremity joint range of motion (ROM) with “universal goniometer”; muscle tones and spasticity with “Modified Ashworth Scale” (MAS) and “Myoton<sup>®</sup>PRO Digital Palpation Device” was evaluated.

“The Trunk Impairment Scale” (TIS) was used to assess the functional strength of the body, its postural control and the nature of the trunk movements. The Pediatric Balance Scale (PBS), an assessment tool adapted from the Berg Balance Scale (BBS), was used to assess children's functional and dynamic balances in daily life activities. Besides, the Pedalo<sup>®</sup> Sensamove Balance Test device was used to evaluate the dynamic balance of children in sitting and standing positions. The Functional Independence Measure (WeeFIM) for children was used to assess children's functional independence in daily activities. Win-Track (Medicaptureurs, France) path and software system was used to evaluate the walking functions (Spatio-temporal parameters) of children.

### **Treatment Program**

The participants were selected for the rehabilitation program in “The Private Dilbade Special Education and Rehabilitation Center” twice a week for 16 weeks (duration of one session is 45 minutes).

Firstly, children participating in the study were included in the rehabilitation program using only the NDT approach for 16 sessions (8 weeks x 2 days x 45 minutes).

Then, the same children were taken into a rehabilitation program in which 16 sessions (8 weeks x 2 days a week) the HS device (30 minutes) and NDT (15 minutes) (HS + NDT method) were used together.

### **Hippotherapy Simulator System Protocol**

Horse Riding Simulator (HRS) device was used as a hippotherapy simulator device. HRS is a simulator consisting of a seat (saddle), control panel, foot pedals, and hand grip, and has four different speed programs (warm-up, level 1-2-3). HRS is a device that moves forward, backward, backward-to-back, right-to-left swing and up-and-down swing in 3 dimensions, similar to the movements of a real horse, forming an 8-shaped movement on five axes. After the children sat in the saddle section, they were first taken to the warm-up speed program for 5 minutes, then to another one of the other speed levels (gradually moved to other speed levels

as appropriate for the development and tolerance of children) and finally to the warm-up speed program for 5 minutes.

### **Neurodevelopmental Therapy Based Rehabilitation**

NDT rehabilitation program was determined according to the children's level of gross motor function, age, gender, mental state, and preferences.

NDT program consists of the rehabilitation of muscle tone disorders, increasing sensory-perception-motor integrity, exercises to increase limb functions and body control, stretching and strengthening exercises for muscle shortness and weakness, exercises that include movements in daily life and training activities such as standing, walking, body care.

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**Statistical Analysis Plan (SAP)**

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### **Statistical Analysis Plan (SAP)**

For the data analysis of our research, an 11.5 version of the statistical program "SPSS (Statistical Package for Social Science) for Windows" was used in the computer environment. With the statistical program, 95 percentage confidence interval and significance were evaluated at  $p < 0.05$  level.

The conformity of the data to normal distribution was analyzed with the "Kolmogorov Smirnov" test. In the Kolmogorov Smirnov test, it was decided that the distributions did not conform to the normal distribution, since  $p < 0.05$  and histogram graphics were skewed. For this reason, analyzes were performed using nonparametric statistical methods.

"Friedman Test (variance analysis in repetitive measurements)" was used to compare the evaluations made after the initial, NDT approach and after the HS + NDT method, and to compare the changes between the results obtained. The pairwise comparisons of the changes in the evaluation results obtained after the Friedman test were analyzed with the "Wilcoxon signed-rank test". Bonferonni correction was made after the Friedman test. As a result, the significance value of 0.05 was divided by 3 and the new significance value was determined as 0.016.



**The Effects of a Hippotherapy Simulator in Children  
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**Informed Consent Form (ICF)**

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**January 11, 2018**

## **Informed Consent Form (ICF)**

### **Description of the Physiotherapist**

This study, which your child will participate in, is scientific research and is called “The Effects of a Hippotherapy Simulator in Children with Cerebral Palsy”. This study aims to research the effect of simulated hippotherapy to correct problems related to standing and sitting balance, gait, trunk involvement, and functionality of your lower limbs in children with spastic cerebral palsy.

The research will be carried out by R.A Pt. Canan GÜNAY YAZICI (Tel: +90 538 460 12 49), under the supervision of Zübeyir SARI, Ph.D., Assoc. Prof. Dr., Marmara University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation, as a master thesis at “The Private Dilbade Special Education and Rehabilitation Center”.

If you agree to participate in the study, your child will be taken to a 16-week physiotherapy and rehabilitation program by physiotherapists. After socio-demographic information about you and your child is obtained before the treatment program, your child's gross motor functions, angle measurements of the lower extremity joints and muscle tone, gait analysis, trunk affection, balance, and daily functions will be evaluated. After the first evaluation, your child will be taken to the 8-week neurodevelopmental treatment program that is routinely applied. After this program is over, your child will be included in the hippotherapy simulator treatment that mimics the movements of a real horse in addition to the neurodevelopmental treatment program. Initial assessments will be repeated at the end of the 8th week and 16th week of the rehabilitation. Your responsibilities regarding this research are to pay attention to your sessions and to follow the suggestions. You should regularly attend a 45-minute session 2 days a week for this study, which is planned to last 16 weeks.

Your child is being invited to a research project. You need to understand why and how this research will be done before making a decision. Please take some time and read the following pieces of information carefully, discuss it with others if you wish. If you have an unclear section or need more detailed information, you can get information from us. You are invited to our research because we think your child matches the criteria to be included. We would like to note that participation is voluntary and that refusal to participate does not lead to any penalty or loss of any benefit. In the same way, you can withdraw from the research at any time.

All your medical and identification information about you and your child will be kept confidential and your identity information will not be provided even if the research is published, but the audience of the research, the attendants, ethical committees and government authorities can access your medical information when necessary. When you want, you can access medical information about yourself and your child.

The evaluation methods and treatment programs to be applied in our study have no known harm or risk. In this regard, you and your child can be safe and comfortable. In case of any unexpected damage during the evaluation and rehabilitation process, you will be informed immediately. In case of any damage to the participants, the necessary applications will be covered by the researchers without any resources. For this, you will not be charged any fees, neither you nor your social security insurance.

While participation in the research does not help you immediately, it is hoped that our research results will have benefits for the organization, society or science in the future. No fee will be charged for this study from you or the social security institution to which you are affiliated.

### **Consent of the Participant**

I have read this entire written document. Since I don't know reading/language, it was understandably read and explained or translated to me. I was allowed to ask, evaluate and make decisions about my child's health status during and after my application and while filling out this form. All kinds of treatment, diagnosis, and alternatives including risks and dangers of treatment were explained. After all these explanations told to me and my child, I accept this invitation for scientific research with my consent.

### **Name and the Surname of the Participant and Legal Representative:**

**Date:**

**Signature:**

### **Name and Surname of the Witness:**

**Date:**

**Signature:**

### **Declaration of the Physiotherapist**

I gave the patient the necessary information about the study and the procedures to be performed. I believe that the patient understood this information, asked me the questions that she/he wanted to ask, and accepted the process with her/his free will.

**Researcher:** Physiotherapist Canan GÜNAY YAZICI

**Address:** Marmara University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation - Başbüyük Maltepe/Istanbul/TURKEY

**Mobile Phone:** +90 538 460 12 49

**E-mail:** cngnyzc@gmail.com

**Date:**

**Signature:**

### **Declaration of the Participant / Legal Representative**

Ms. Canan GÜNAY YAZICI said that medical research would be conducted and explained the above information about this research to me. I know that my child is invited to this research as a participant. If I participate in this research, I believe that the confidentiality of my child's information will be handled with great care and respect during the research. During the conduct of the study, information was provided that my child's personal information would be carefully protected. I also know that this information will only be used for educational and scientific purposes. During the research, I can withdraw from work at any time without any reason (However, in this case, I am aware of the difficult situation that the researchers will cause if I do not report anything). I do not take any financial responsibility for the research costs. There will be no payment for me. I will not be exposed to any monetary burden in any health problem that may arise directly or indirectly during the research. When we encounter any health problems during the research; I know that I can call the physiotherapist Canan GÜNAY YAZICI on an hour from +90 538 460 120 49 (mobile) phone.

We did not experience any compulsive behavior to participate in the research. I know that if we refuse to participate, this will not harm our current treatment and our relationship with the physiotherapist.

I understood all the explanations made to me in detail. At the end of a certain thinking period, I decided that my child could participate in this research project as a participant. I voluntarily accept this invitation on behalf of my child.

## **Voluntary Approval Form**

I have read the text above which shows the information that should be given to the volunteer before investigating. These were written and was explained verbally. With these conditions, I agree to participate in this research without any pressure or compulsion on me and my child.

A signed copy of this four-page form will be given to me.

### **Name and the Surname of the Participant and Legal Representative:**

**Date:**

**Signature:**

**Name and Surname of the Witness** (who have witnessed the process of receipt until the end):

**Date:**

**Signature:**

The researcher who made the explanations,

**Researcher:** Physiotherapist Canan GÜNAY YAZICI

**Address:** Marmara University, Institute of Health Sciences, Department of Physiotherapy and Rehabilitation - Başbüyük Maltepe/Istanbul/TURKEY

**Mobile Phone:** +90 538 460 12 49

**E-mail:** cngnyzc@gmail.com

**Date:**

**Signature:**

**Annex 1.** Marmara University Faculty of Medicine Clinical Researches Ethics Committee Approval (Approval made at the meeting on 02.09.2016 with approval number: 09.2016.478)



Marmara Üniversitesi Tıp Fakültesi  
Klinik Araştırmalar Etik Kurulu

<i>BAŞVURU BİLGİLERİ</i>	<b>PROTOKOL KODU</b>	09.2016.478
	<b>PROJE ADI</b>	Serbral Palsi'li Çocuklarda simüle Hippoterapi Eğitiminin Etkinliği
	<b>SORUMLU ARAŞTIRICI ÜNVANI/ADI</b>	Doç. Dr. Zübeyir SARI

<i>KARAR BİLGİLERİ</i>	Tarih	02.09.2016			
	Yukarıda başvuru bilgileri verilen araştırma başvuru dosyası ve ilgili belgeler araştırmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş ve gerçekleştirilmesinde sakınca bulunmadığı için Kurulumuzca onaylanmasına oy birliği ile karar verilmiştir. Onay sonrasında yapılacak her türlü proje değişiklikleri (katılımcılar, başlık vb.) veya protokol değişikliklerinin Etik Kurula bildirilerek projenin yenilenmesi gerekmektedir.				
<b>ÜYELER</b>					
Unvanı / Adı / Soyadı	Uzmanlık Dalı	Kurumu / EK Üyeligi	Onaylanan Proje ile ilişkisi	Toplantıya katılım	İmza
Prof.Dr. Haner DİRESKENELİ	Romatoloji	M.Ü Tıp Fakültesi/ Başkan	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof.Dr. Tülin ERGUN	Dermatoloji	M.Ü Tıp Fakültesi/Başkan Yrd.	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof.Dr. Handan KAYA	Patoloji	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof.Dr. M.Bahadır GÜLLÜOĞLU	Genel Cerrahi	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof.Dr. Atilla KARAALP	Farmakoloji	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> EVET <input checked="" type="checkbox"/> HAYIR	
Prof.Dr. Semra SARDAŞ	Eczacı	M.Ü Eczacılık Fak./Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof.Dr. Başak DOĞAN	Diş Hekimi	M.Ü Diş Hekimliği Fak./Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Prof. Dr. Beste Melek ATASOY	Radyasyon Onkolojisi	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Doç. Dr. Elif KARAKOÇ AYDINER	Çocuk Sağlığı ve Hastalıkları	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Doç.Dr. Meltem KORAY	Diş Hekimi	İstanbul Üniv. Diş Hekimliği Fak./Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Doç.Dr. Tolga GÜVEN	Tıp Tarihi ve Etik	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Doç. Dr. Gürkan SERT	Hukukçu	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Yrd.Doç.Dr: Figen DEMİR	Halk Sağlığı	Acıbadem Üniv. Tıp Fak.	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Yrd.Doç.Dr. Pınar Mega TİBER	Biyofizik	M.Ü Tıp Fakültesi/Üye	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	
Gözde Aynur MİRZA	Sağlık Mensubu olmayan kişi	Serbest	Var Yok	<input type="checkbox"/> Evet <input checked="" type="checkbox"/> Hayır	

## Annex 2. Participants Tracking Form

No.			Date.
Name-Surname			
Address			
Phone			
Gender	Female <input type="checkbox"/>	Male <input type="checkbox"/>	Age
Height	Weight		
CP Type	Hemiparesis <input type="checkbox"/>	Diparesis <input type="checkbox"/>	Quadriparesis <input type="checkbox"/>
GMFCS Level	I <input type="checkbox"/>	II <input type="checkbox"/>	III <input type="checkbox"/>
Education Level			
Having surgery/date			
Botulinum toxin injections./date			
Auxiliary tool used			
Orthotic/device used			

## PASSIVE RANGE OF MOTION

MEASURE	BEFORE		8. WEEKS		16.WEEKS	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Hip flexion						
Hip extension						
Hip internal rotation						
Hip external rotation						
Hip abduction						
Hip adduction						
Knee flexion						
Knee extension						
Dorsiflexion						
Plantar flexion						
Trunk lateral flexion						
Trunk flexion						
Trunk extension						

## MODIFIED ASHWORTH SCALE

MEASURE	BEFORE		8. WEEKS		16.WEEKS	
	LEFT	RIGHT	LEFT		LEFT	RIGHT
Hip flexion						
Hip abduction						
Hamstring						
Quadriceps						
Gastrocnemius						
Soleus						

### Grade      Description

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0	No increase in muscle tone
1	Slight increase in muscle tone, manifested by a catch and release or by minimal resistance at the end of the range of motion when the affected part/s is/are moved in flexion or extension.
1+	Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM.
2	More marked increase in muscle tone through most of the ROM, but affected part(s) easily moved.
3	Considerable increase in muscle tone, passive movement difficult.
4	Affected part(s) rigid in flexion or extension.

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ROM, range of motion.

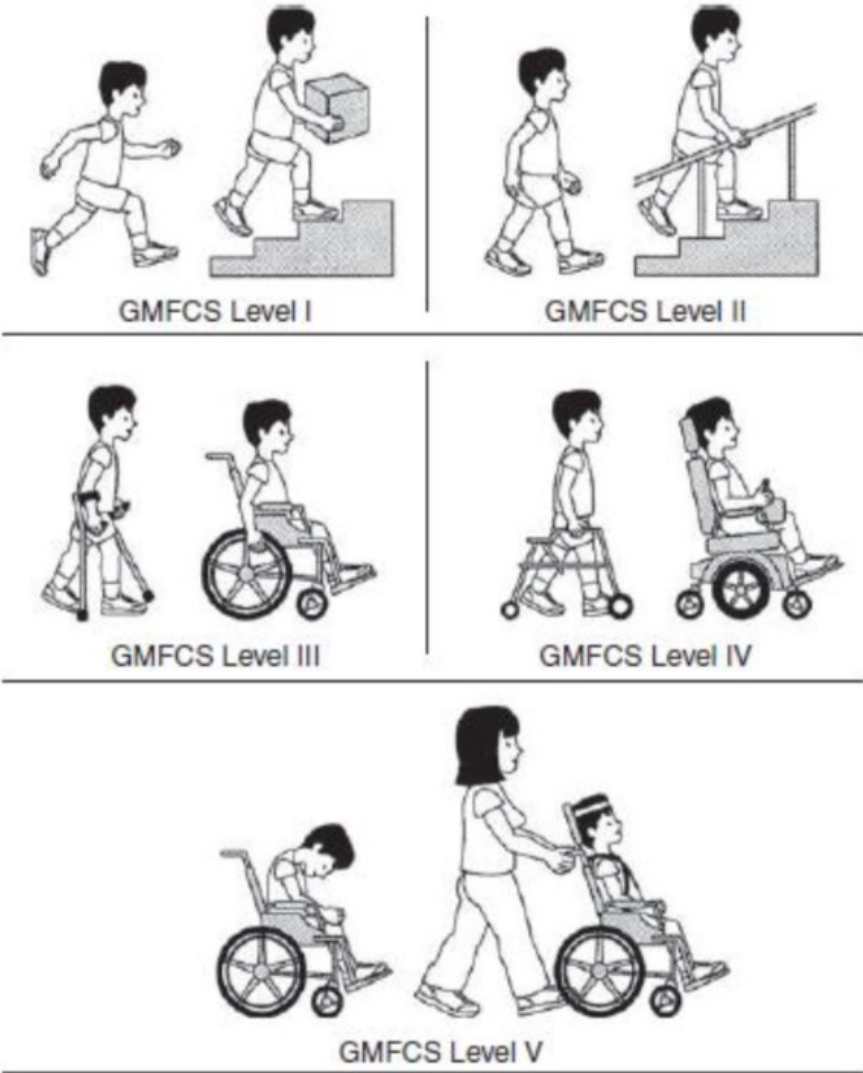
## MYOTON® PRO DIGITAL PALPATION DEVICE

MEASURE	BEFORE		8. WEEKS		16.WEEKS	
	LEFT	RIGHT	LEFT		LEFT	RIGHT
Hip flexion						
Hip adduction						
Hamstring (semitendinosus, biceps femoris)						
Quadriceps (rectus femoris, vastus lateralis, vastus medialis)						
Gastrocnemius						
Soleus						



**GROSS MOTOR FUNCTIONAL CLASSIFICATION SYSTEM (GMFCS)**

**Level of the participant:**



## THE TRUNK IMPAIRMENT SCALE

Item			
<b>Static sitting balance</b>			
1	Starting position	Patient falls or cannot maintain starting position for 10 seconds without arm support	<input type="checkbox"/> 0
		Patient can maintain starting position for 10 seconds	<input type="checkbox"/> 2
		If score = 0, then TIS total score = 0	
2	Starting position Therapist crosses the unaffected leg over the hemiplegic leg	Patient falls or cannot maintain sitting position for 10 seconds without arm support	<input type="checkbox"/> 0
		Patient can maintain sitting position for 10 seconds	<input type="checkbox"/> 2
3	Starting position Patient crosses the unaffected leg over the hemiplegic leg	Patient falls	<input type="checkbox"/> 0
		Patient cannot cross the legs without arm support on bed or table	<input type="checkbox"/> 1
		Patient crosses the legs but displaces the trunk more than 10 cm backwards or assists crossing with the hand	<input type="checkbox"/> 2
		Patient crosses the legs without trunk displacement or assistance	<input type="checkbox"/> 3
		Total static sitting balance	/7
<b>Dynamic sitting balance</b>			
1	Starting position Patient is instructed to touch the bed or table with the hemiplegic elbow (by shortening the hemiplegic side and lengthening the unaffected side) and return to the starting position	Patient falls, needs support from an upper extremity or the elbow does not touch the bed or table	<input type="checkbox"/> 0
		Patient moves actively without help, elbow touches bed or table	<input type="checkbox"/> 1
		If score = 0, then items 2 and 3 score 0	
2	Repeat item 1	Patient demonstrates no or opposite shortening/lengthening	<input type="checkbox"/> 0
		Patient demonstrates appropriate shortening/lengthening	<input type="checkbox"/> 1
		If score = 0, then item 3 scores 0	
3	Repeat item 1	Patient compensates. Possible compensations are: (1) use of upper extremity, (2) contralateral hip abduction, (3) hip flexion (if elbow touches bed or table further than proximal half of femur), (4) knee flexion, (5) sliding of the feet	<input type="checkbox"/> 0
		Patient moves without compensation	<input type="checkbox"/> 1
4	Starting position Patient is instructed to touch the bed or table with the unaffected elbow (by shortening the unaffected side and lengthening the hemiplegic side) and return to the starting position	Patient falls, needs support from an upper extremity or the elbow does not touch the bed or table	<input type="checkbox"/> 0
		Patient moves actively without help, elbow touches bed or table	<input type="checkbox"/> 1
		If score = 0, then items 5 and 6 score 0	
5	Repeat item 4	Patient demonstrates no or opposite shortening/lengthening	<input type="checkbox"/> 0
		Patient demonstrates appropriate shortening/lengthening	<input type="checkbox"/> 1
		If score = 0, then item 6 scores 0	

6	Repeat item 4	Patient compensates. Possible compensations are: (1) use of upper extremity, (2) contralateral hip abduction, (3) hip flexion (if elbow touches bed or table further than proximal half of femur), (4) knee flexion, (5) sliding of the feet Patient moves without compensation	<input type="checkbox"/> 0 <input type="checkbox"/> 1
7	Starting position Patient is instructed to lift pelvis from bed or table at the hemiplegic side (by shortening the hemiplegic side and lengthening the unaffected side) and return to the starting position	Patient demonstrates no or opposite shortening/lengthening Patient demonstrates appropriate shortening/lengthening If score = 0, then item 8 scores 0	<input type="checkbox"/> 0 <input type="checkbox"/> 1
8	Repeat item 7	Patient compensates. Possible compensations are: (1) use of upper extremity, (2) pushing off with the ipsilateral foot (heel loses contact with the floor) Patient moves without compensation	<input type="checkbox"/> 0 <input type="checkbox"/> 1
9	Starting position Patient is instructed to lift pelvis from bed or table at the unaffected side (by shortening the unaffected side and lengthening the hemiplegic side) and return to the starting position	Patient demonstrates no or opposite shortening/lengthening Patient demonstrates appropriate shortening/lengthening If score = 0, then item 10 scores 0	<input type="checkbox"/> 0 <input type="checkbox"/> 1
10	Repeat item 9	Patient compensates. Possible compensations are: (1) use of upper extremities, (2) pushing off with the ipsilateral foot (heel loses contact with the floor) Patient moves without compensation Total dynamic sitting balance	<input type="checkbox"/> 0 <input type="checkbox"/> 1 /10
<b>Co-ordination</b>			
1	Starting position Patient is instructed to rotate upper trunk 6 times (every shoulder should be moved forward 3 times), first side that moves must be hemiplegic side, head should be fixated in starting position	Hemiplegic side is not moved three times Rotation is asymmetrical Rotation is symmetrical If score = 0, then item 2 scores 0	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
2	Repeat item 1 within 6 seconds	Rotation is asymmetrical Rotation is symmetrical	<input type="checkbox"/> 0 <input type="checkbox"/> 1
3	Starting position Patient is instructed to rotate lower trunk 6 times (every knee should be moved forward 3 times), first side that moves must be hemiplegic side, upper trunk should be fixated in starting position	Hemiplegic side is not moved three times Rotation is asymmetrical Rotation is symmetrical If score = 0, then item 4 scores 0	<input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2
4	Repeat item 3 within 6 seconds	Rotation is asymmetrical Rotation is symmetrical Total co-ordination	<input type="checkbox"/> 0 <input type="checkbox"/> 1 /6
			Total Trunk Impairment Scale /23

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## PEDIATRIC BALANCE TEST

All items are scored between 0 and 4 and the total score is calculated.

Pediatric Balance Scale Items	
1	Sitting to standing
2	Standing to sitting
3	Transfers
4	Standing unsupported
5	Sitting unsupported
6	Standing with eyes closed
7	Standing with feet together
8	Standing with one foot in front
9	Standing on one foot
10	Turning 360 degrees
11	Turning to look behind
12	Retrieving object from floor
13	Placing alternate foot on stool
14	Reaching forward with outstretched arm

## THE FUNCTIONAL INDEPENDENCE MEASURE (WEEFIM) (WEE-FIM)

Items	Descriptive Items
Domain 1: self-care (maximum = 56)	
1	Eating
2	Grooming
3	Bathing
4	Dressing-upper
5	Dressing-lower
6	Toileting
7	Bladder
8	Bowel
Domain 2: mobility (maximum = 35)	
9	Chair transfer
10	Toilet transfer
11	Tub transfer
12	Walk
13	Stairs
Domain 3: cognition (maximum = 35)	
14	Comprehension
15	Expression
16	Social interaction
17	Problem solving
18	Memory
Total scores = 126	

7 = Fully independent 6 = Modified independent	Unaided
5 = Surveillance is required 4 = Minimal aid (75% of children) 3 = Moderate help (50% of children)	Helped / Modified Dependent
2 = Maximum help (25% of children) 1 = Full help (<less than 25% of children do)	Totally Dependent

## GROSS MOTOR FUNCTION MEASURE-88

Item	A: LYING & ROLLING	SCORE				NT
1.	SUP, HEAD IN MIDLINE: TURNS HEAD WITH EXTREMITIES SYMMETRICAL .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	1.
* 2.	SUP: BRINGS HANDS TO MIDLINE, FINGERS ONE WITH THE OTHER.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	2.
3.	SUP: LIFTS HEAD 45°.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	3.
4.	SUP: FLEXES R HIP & KNEE THROUGH FULL RANGE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4.
5.	SUP: FLEXES L HIP & KNEE THROUGH FULL RANGE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	5.
* 6.	SUP: REACHES OUT WITH R ARM, HAND CROSSES MIDLINE TOWARD TOY.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	6.
* 7.	SUP: REACHES OUT WITH L ARM, HAND CROSSES MIDLINE TOWARD TOY.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	7.
8.	SUP: ROLLS TO PR OVER R SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	8.
9.	SUP: ROLLS TO PR OVER L SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	9.
* 10.	PR: LIFTS HEAD UPRIGHT.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	10.
11.	PR ON FOREARMS: LIFTS HEAD UPRIGHT, ELBOWS EXT., CHEST RAISED.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	11.
12.	PR ON FOREARMS: WEIGHT ON R FOREARM, FULLY EXTENDS OPPOSITE ARM FORWARD.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	12.
13.	PR ON FOREARMS: WEIGHT ON L FOREARM, FULLY EXTENDS OPPOSITE ARM FORWARD.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	13.
14.	PR: ROLLS TO SUP OVER R SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	14.
15.	PR: ROLLS TO SUP OVER L SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	15.
16.	PR: PIVOTS TO R 90° USING EXTREMITIES.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	16.
17.	PR: PIVOTS TO L 90° USING EXTREMITIES.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	17.
<b>TOTAL DIMENSION A</b>						

Item	B: SITTING	SCORE				NT
* 18.	SUP, HANDS GRASPED BY EXAMINER: PULLS SELF TO SITTING WITH HEAD CONTROL.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	18.
19.	SUP: ROLLS TO R SIDE, ATTAINS SITTING.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	19.
20.	SUP: ROLLS TO L SIDE, ATTAINS SITTING.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	20.
* 21.	SIT ON MAT, SUPPORTED AT THORAX BY THERAPIST: LIFTS HEAD UPRIGHT, MAINTAINS 3 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	21.
* 22.	SIT ON MAT, SUPPORTED AT THORAX BY THERAPIST: LIFTS HEAD MIDLINE, MAINTAINS 10 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	22.
* 23.	SIT ON MAT, ARM(S) PROPPING: MAINTAINS, 5 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	23.
* 24.	SIT ON MAT: MAINTAIN, ARMS FREE, 3 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	24.
* 25.	SIT ON MAT WITH SMALL TOY IN FRONT: LEANS FORWARD, TOUCHES TOY, RE-ERECTS WITHOUT ARM PROPPING.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	25.
* 26.	SIT ON MAT: TOUCHES TOY PLACED 45° BEHIND CHILD'S R SIDE, RETURNS TO START.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	26.
* 27.	SIT ON MAT: TOUCHES TOY PLACED 45° BEHIND CHILD'S L SIDE, RETURNS TO START.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	27.
28.	R SIDE SIT: MAINTAINS, ARMS FREE, 5 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	28.
29.	L SIDE SIT: MAINTAINS, ARMS FREE, 5 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	29.
* 30.	SIT ON MAT: LOWERS TO PR WITH CONTROL.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	30.
* 31.	SIT ON MAT WITH FEET IN FRONT: ATTAINS 4 POINT OVER R SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	31.
* 32.	SIT ON MAT WITH FEET IN FRONT: ATTAINS 4 POINT OVER L SIDE.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	32.
33.	SIT ON MAT: PIVOTS 90°, WITHOUT ARMS ASSISTING.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	33.
* 34.	SIT ON BENCH: MAINTAINS, ARMS AND FEET FREE, 10 SECONDS.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	34.
* 35.	STD: ATTAINS SIT ON SMALL BENCH.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	35.
* 36.	ON THE FLOOR: ATTAINS SIT ON SMALL BENCH.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	36.
* 37.	ON THE FLOOR: ATTAINS SIT ON LARGE BENCH.....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	37.
<b>TOTAL DIMENSION B</b>						

Item	C: CRAWLING & KNEELING	SCORE				NT
38.	PR: CREEPS FORWARD 1.8m (6') .....	0	1	2	3	38.
* 39.	4 POINT: MAINTAINS, WEIGHT ON HANDS AND KNEES, 10 SECONDS .....	0	1	2	3	39.
* 40.	4 POINT: ATTAINS SIT ARMS FREE .....	0	1	2	3	40.
* 41.	PR: ATTAINS 4 POINT, WEIGHT ON HANDS AND KNEES .....	0	1	2	3	41.
* 42.	4 POINT: REACHES FORWARD WITH R ARM, HAND ABOVE SHOULDER LEVEL .....	0	1	2	3	42.
* 43.	4 POINT: REACHES FORWARD WITH L ARM, HAND ABOVE SHOULDER LEVEL .....	0	1	2	3	43.
* 44.	4 POINT: CRAWLS OR HITCHES FORWARD 1.8m(6') .....	0	1	2	3	44.
* 45.	4 POINT: CRAWLS RECIPROCALLY FORWARD 1.8m ( 6') .....	0	1	2	3	45.
* 46.	4 POINT: CRAWLS UP 4 STEPS ON HANDS AND KNEES/FEET .....	0	1	2	3	46.
47.	4 POINT: CRAWLS BACKWARDS DOWN 4 STEPS ON HANDS AND KNEES/FEET .....	0	1	2	3	47.
* 48.	SIT ON MAT: ATTAINS HIGH KN USING ARMS, MAINTAINS, ARMS FREE, 10 SECONDS .....	0	1	2	3	48.
49.	HIGH KN: ATTAINS HALF KN ON R KNEE USING ARMS, MAINTAINS, ARMS FREE, 10 SECONDS .....	0	1	2	3	49.
50.	HIGH KN: ATTAINS HALF KN ON L KNEE USING ARMS, MAINTAINS, ARMS FREE, 10 SECONDS .....	0	1	2	3	50.
* 51.	HIGH KN: KN WALKS FORWARD 10 STEPS, ARMS FREE .....	0	1	2	3	51.
<b>TOTAL DIMENSION C</b>					<input style="width: 150px; height: 20px;" type="text"/>	

Item	D: STANDING	SCORE				NT
* 52.	ON THE FLOOR: PULLS TO STD AT LARGE BENCH .....	0	1	2	3	52.
* 53.	STD: MAINTAINS, ARMS FREE, 3 SECONDS .....	0	1	2	3	53.
* 54.	STD: HOLDING ON TO LARGE BENCH WITH ONE HAND, LIFTS R FOOT, 3 SECONDS .....	0	1	2	3	54.
* 55.	STD: HOLDING ON TO LARGE BENCH WITH ONE HAND, LIFTS L FOOT, 3 SECONDS .....	0	1	2	3	55.
* 56.	STD: MAINTAINS, ARMS FREE, 20 SECONDS .....	0	1	2	3	56.
* 57.	STD: LIFTS L FOOT, ARMS FREE, 10 SECONDS .....	0	1	2	3	57.
* 58.	STD: LIFTS R FOOT, ARMS FREE, 10 SECONDS .....	0	1	2	3	58.
* 59.	SIT ON SMALL BENCH: ATTAINS STD WITHOUT USING ARMS .....	0	1	2	3	59.
* 60.	HIGH KN: ATTAINS STD THROUGH HALF KN ON R KNEE, WITHOUT USING ARMS .....	0	1	2	3	60.
* 61.	HIGH KN: ATTAINS STD THROUGH HALF KN ON L KNEE, WITHOUT USING ARMS .....	0	1	2	3	61.
* 62.	STD: LOWERS TO SIT ON FLOOR WITH CONTROL, ARMS FREE .....	0	1	2	3	62.
* 63.	STD: ATTAINS SQUAT, ARMS FREE .....	0	1	2	3	63.
* 64.	STD: PICKS UP OBJECT FROM FLOOR, ARMS FREE, RETURNS TO STAND .....	0	1	2	3	64.
<b>TOTAL DIMENSION D</b>					<input style="width: 150px; height: 20px;" type="text"/>	

Item	E: WALKING, RUNNING & JUMPING	SCORE				NT
* 65.	STD, 2 HANDS ON LARGE BENCH: CRUISES 5 STEPS TO R .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	65.
* 66.	STD, 2 HANDS ON LARGE BENCH: CRUISES 5 STEPS TO L .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	66.
* 67.	STD, 2 HANDS HELD: WALKS FORWARD 10 STEPS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	67.
* 68.	STD, 1 HAND HELD: WALKS FORWARD 10 STEPS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	68.
* 69.	STD: WALKS FORWARD 10 STEPS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	69.
* 70.	STD: WALKS FORWARD 10 STEPS, STOPS, TURNS 180°, RETURNS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	70.
* 71.	STD: WALKS BACKWARD 10 STEPS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	71.
* 72.	STD: WALKS FORWARD 10 STEPS, CARRYING A LARGE OBJECT WITH 2 HANDS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	72.
* 73.	STD: WALKS FORWARD 10 CONSECUTIVE STEPS BETWEEN PARALLEL LINES 20cm (8") APART .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	73.
* 74.	STD: WALKS FORWARD 10 CONSECUTIVE STEPS ON A STRAIGHT LINE 2cm (3/4") WIDE .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	74.
* 75.	STD: STEPS OVER STICK AT KNEE LEVEL, R FOOT LEADING .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	75.
* 76.	STD: STEPS OVER STICK AT KNEE LEVEL, L FOOT LEADING .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	76.
* 77.	STD: RUNS 4.5m (15'), STOPS & RETURNS .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	77.
* 78.	STD: KICKS BALL WITH R FOOT .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	78.
* 79.	STD: KICKS BALL WITH L FOOT .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	79.
* 80.	STD: JUMPS 30cm (12") HIGH, BOTH FEET SIMULTANEOUSLY .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	80.
* 81.	STD: JUMPS FORWARD 30 cm (12"), BOTH FEET SIMULTANEOUSLY .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	81.
* 82.	STD ON R FOOT: HOPS ON R FOOT 10 TIMES WITHIN A 60cm (24") CIRCLE .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	82.
* 83.	STD ON L FOOT: HOPS ON L FOOT 10 TIMES WITHIN A 60cm (24") CIRCLE .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	83.
* 84.	STD, HOLDING 1 RAIL: WALKS UP 4 STEPS, HOLDING 1 RAIL, ALTERNATING FEET .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	84.
* 85.	STD, HOLDING 1 RAIL: WALKS DOWN 4 STEPS, HOLDING 1 RAIL, ALTERNATING FEET .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	85.
* 86.	STD: WALKS UP 4 STEPS, ALTERNATING FEET .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	86.
* 87.	STD: WALKS DOWN 4 STEPS, ALTERNATING FEET .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	87.
* 88.	STD ON 15cm (6") STEP: JUMPS OFF, BOTH FEET SIMULTANEOUSLY .....	0 <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	88.

TOTAL DIMENSION E