

# Sitting system for people health and social care essay

People



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Appropriate posing positions are varied, it depends on activity taken ; working at a desk, computing machine, driving or eating. However, these actions have a same rule to concern: stable and comfy. Human sitting is asymmetrical and dynamic, when Sitters feel non comfy with their seats they will brace themselves. And ever has changeless motion at least every 5-10 proceedings to diminish the force per unit area on the contact points, avoid terrible pressing on any portion of the organic structure until cause hurt.

### **1. 3. 1 Biomechanics of siting**

Biomechanics utilises the Torahs of Physics and the constructs of Engineering to depict the gesture formulated by assorted organic structure sections and the forces moving on these them ( Chaffin and Andresson, 1984) . Appropriate posing positions are varied, it depends on activity which taken ; working at a desk, computing machine, driving or eating. However, suited sitting place in biomechanics is the balance of forces and minutes.

balance plane1. bmp

F = Force

M = Moment

Balance of forces and minutes in all planes

Biomechanics has emphasised the relation between the organic structure 's Centre of force per unit area ( COP ) and its Centre of mass ( COM ) . The COM is a point equivalent of the entire organic structure mass and is the leaden norm of the COM of each organic structure section in all planes while

the COP corresponds to the point of application of the force under the country of contact with the place surface ( Lacoste et al. , 2006 ) . In order to equilibrate the organic structure over a stable sitting base, the COM is straight over the sitting base. Stability of sitting position is able to better when the country of contact between the organic structure and the support surface are increased. The relationship of the stableness with country of contact and forces is following:

### Stability

Therefore increasing the size of the base of support will increase the stableness ( Ham et al. , 1998 ) . For some postural malformations, the country of the support base is reduced therefore the stableness is improved by addition the support country such as supplying the chest support bole support or buffering on the seating.

The balance of sitting encourages the right form or position of spinal. In sidelong position, alliance of spinal is looked somewhat S- form. The key of stable base is the pelvic girdle. In the basic of normal posing, the pelvic girdle is centred and rotates rearward as a consequence of the tenseness in hamstrings ( posterior thigh musculuss ) . For maximal stableness and minimal musculus attempt when keeping an unsloped position ( every bit same as in the erect standing place ) , the Centre of mass of the upper organic structure should be maintained over the ischeal tubercles ( Zacharkow, 1984 )

balance plane2. bmp

The contact points of the seated position are ischial tubercles, thighs and feet. By supplying support through the thighs, legs and feet, force per unit area is reduced over the ischial tubercles. The thighs are parallel to each other and in the natural place. For the ground that thigh muscles pull the hip and articulation of the knee, the grade of hip flexure and knee extension on the seating should be avoided to pull of hamstrings. An upper limit of 100 degrees of hip flexure and 105 degrees of articulation of the knee extension is advised ( Mayall and Desharnais, 1995 ) . The pelvic girdle rotates somewhat forward promotes flexure of the lower dorsum or lumbar hollow-back. It will be curved concave to the front to back up the weight of the upper portion: head, shoulders and arms.

However, for the people with physical disabilities who are lacking in postural ability and postural dissymmetries can besides take to orthopaedic malformations, uncomfotableness, decreased physiologic maps, self-image, and quality of life ( Trefler et al. , 1993 ) . Consequently, users with a motor disability need a seating which can counterbalance for the stability and besides back up the functional and postural ability that each person has.

There are many ways to depict the assortment of sitting systems for people with physical disabilities. However, in this survey, the seating system will be categorised by 3 characteristics of the chair as shown in table Twenty.

## **Siting system for people with physical disabilities**

### **Feature**

### **Categorization**

Functional of utilizing

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Wheelchair

Particular seating

Beginning of energy

Manual

Power

Feature of traveling

Rigid

Dynamic

### **1. 3. 2 Wheelchair population**

A wheelchair is one of the most common devices used to help users who have limited abilities to walk or travel. The wheelchair user population includes kids, grownups, and aged individuals. There are many grounds for their disablements: birth defects ( kids who have motion upsets ) , accidents ( an hurt to legs or the spinal column, which controls leg motion ) , infirmity diseases and old age. Harmonizing to Wheelchair foundation, `` over 100 million people with physical disablements worldwide need wheelchairs. It is estimated that the figure of people who need wheelchairs will increase by 22 per centum over the following 10 old ages, with the greatest demand bing in developing states '' ( Behring. , 2009 ) .

In UK, there are an estimated 10 million handicapped people, about 20 % of population ( Office for National Statistics, 2010 ; Statisticss, 2008 ) and 5 %  
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of people with disablement are a motor damage ( NHS, 2004 ; Wray, 2005 ) .

The proportion of wheelchair population additions with age. Separate into three age groups: kids under 18 old ages of age, grownup 18-64 twelvemonth and aged 65 and older, the highest rates are found among the aged population so working age and non many in kids. There are assorted wellness conditions and damages doing a individual demand to utilize wheelchair and these grounds are diverse in different age group of users. In table Twenty shows the wellness conditions and damages reported as the chief cause of functional or activity restriction.

Stroke

11. 1 %

Arthritis

10. 4 %

Multiple induration

5. 0 %

Absence lower appendage

3. 7 %

Paraplegia

3. 6 %

Orthopaedic lower appendage

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3.6 %

Heart disease

3.3 %

Cerebral paralysis

3.1 %

Rheumatoid arthritis

3.0 %

Diabetess

2.4 %

( LaPlante et al. , 2009 )

Manual seating system is the chair that needs self impeling by users or health professionals. The users of manual wheelchairs by and large have lower appendage failing, palsy, or amputation doing walking insecure or hard at best. They may include persons with spinal cord hurts, unilateral paralysis and other types of palsy, multiple induration, intellectual paralysis, spina bifida, arthritis, and lower limb amputations. Typically, the user is a paraplegic or quadriparetic individual who desires to manually impel himself every bit much as possible for the exercising and ensuing wellness benefits.

For the wheelchair dependent individual who has to impel by his or her ain, the most common country of musculoskeletal is the shoulder. This is

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because users normally have overload on their upper organic structures to turn the wheels of the wheelchairs. In 2008, Desroches et Al. published a paper in which they studied the relationship between the effectivity of the attendant force at the handrims and the mechanical burden by the net shoulder minutes. They found that more force demands are more at hazard of shoulder hurts on the land that overexploitation. Furthermore, elbows, carpus and wrists are besides injured because they are non designed to get by with the insistent contact with the wheelchair pushrims. This frequent insistent burden may be one of the possible causes of the incidence of carpal tunnel syndrome.

Powered wheelchair theoretical accounts are controlled by the user 's manus with a little control stick. Users who unable to utilize a manus for maneuvering and control may be capable of a oral cavity control or breath control device. These power wheelchairs are much safer to run with a computing machine inadvertence. However, serious accidents sometimes result from feeling or computing machine system failures. ( N. I. R. E. , 2004 ) . The failures may be elusive 1s non recognised by users. Otherwise, they can be in the signifier of a sudden, unexpected entire failure of the wheelchair computing machine system, which may ensue in an accident when happening at a critical clip.

### **1. 3. 3 Particular Seating**

Particular seating designed for people with physical disablements considers demands like phase of development, disablements and other upsets. At the same clip, ought to see as position, force per unit area and comfort. The



mobility and position jobs that motor impairment people face may be due to muscle failings, musculus instabilities and cramp or hapless esthesis. There are many grounds for their disablements like birth defects ( kids who have motion upsets ) , accidents ( an hurt to legs or the spinal column, which controls leg motion ) , infirmity diseases and old age.

Siting is a work of complex coordinating of human constructions. The form of the pelvic girdle is unstable by nature in sitting place. It can non be kept stable without the cooperation of organic structure musculus and limbs. In add-on, a proper design of constituents such as place backrest, armrest, footrest, etc. , is encourage stableness in the sitting place and the comfort of the place.

First and the foremost for handicapped posing is the importance of stable posing, it is achieved if there is a balance of forces and minutes in all planes ( Letts, 1991 ) . An unstable sitting non merely makes upper organic structure hard to command balance but besides non keep the good place of physiology. A particular place base with a back support can be used which would assists the patient who is being positioned for physical therapy. The supports are made from stuffs such as plyboard, froth and polymer. These stuffs provide postural support and alleviate the force per unit area for patients who have unbalanced organic structures. Nevertheless for kids who have the spasticity CP, they will do their organic structure imbalanced and unstable when have extensor cramp. This in bend makes the patient uncomfortable and impairs their functional ability. Furthermore, CP kids need more seating demands than a broad assortment of people with disablements

because of their overactive stretch physiological reactions and irregular stableness.

The force per unit area sores are besides considered because this frequently occurs when sitting for a long clip without traveling. A considerable sum of literature has been published on biomechanics of siting system with spastic CP patients, they have investigated the force per unit area forces in sitting place and strong forces of extensor push in patients which impart onto their wheelchairs and they found that high forces can besides do hurts for the kid ( Dawley and Julian, 2003 ; Hahn et al. , 2009 ) .

The force per unit area ulcers that suffer from force per unit area force in sitting have been concerned for many decennaries. Harrison et Al. published a paper in which they reviewed the literature of sitting biomechanics in normal organic structures. The thought of dynamic seating has been designed in Germany since 1884 for mills that had adjustable backrests and place undersides with rounded forepart borders to cut down force per unit area on the under-thigh part ( Harrison et al. , 1999 ) .

The chief aim of presenting the dynamic seating to the design of the chair is to avoid the force per unit area ulcer. Dynamic siting systems have been available on the market since 1989 ( Hahn et al. , 2009 ) by including spring loaded, elastic constituents or powered devices, in the outlook that it will react suitably to the users with strong musculus cramp, cut down the hurting and cut down force per unit area from restricted position. For people with physical disablements particularly patients who have strong extensor spasticity the dynamic design ease them non merely to forestall the force

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per unit area ulcer and hurt to the user but besides prevent breakage of the chair. Dynamic seating constituents are designed to travel as a consequence of forceful motions exerted by a client ( Magnuson and Dilabio, 2003 ). The dispute of the effectivity and impact of the surrogate design has been discussed. Several surveies have attempted to explicate that to repair a place would be more good for patients ' physical therapy than to change the sitting position every clip of extensor cramp ( Barnes, 1998 ; Herman and Lange, 1999 ). However, the surrogate design is presumed that when musculuss stretch, the forces produced between place 's parts and their organic structures would diminish with usage of the dynamic constituents. Furthermore, this system can be approved and it does non hold any negative consequence for the long term use. The basic apprehension of physical features of the user is indispensable for the design and consideration of postural support. Furthermore, it is really indispensable to understand the scope of the forces that are being applied to the user 's organic structure when using postural support within a seating system.

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