ARTICLE

# Hip problems in adults with spastic quadriplegic cerebral palsy

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**Abstract**
The objective of this study was to review the prevalence of hip pain, hip dislocation, sitting balance difficulty and perineal care difficulty in adults with spastic quadriplegic cerebral palsy (SQCP). A total of 36 patients with SQCP were identified by the study, and 35 completed questionnaires. Hip related problems were common in the study group with 43% reporting current hip pain, 40% reporting difficulty with sitting balance and 40% reporting difficulty with perineal care. No association was found between these hip related problems.

Cerebral palsy is a diagnosis dependent on the presence of a non-progressive lesion of the central nervous system, motor impairment caused by this lesion, and onset before the age of two. Patients with SQCP suffer from severe motor impairment in all four limbs and abnormal posture. Cognitive impairment is common, with full-time care often required. Spasticity in the lower limbs is the cause of hip dislocation and can lead to hip pain, impaired sitting balance, problems with perineal care and fracture.

Reported prevalence of hip pain in patients with SQCP varies between 29% and 47%.[2 4 6-8] Studies show an association between hip pain and hip dislocation. Moreau et al[5] and Sherk et al[9] found that half (52.4%, 53.3% respectively) of their patients with a dislocated hip experienced hip pain. However, Hodgkinson et al noted that 22% of his patients with reduced hips also experienced hip pain,[2] suggesting that there are other contributory factors and that hip reduction alone may not improve pain in some patients with a dislocation.

Sitting balance influences the ability to use wheelchairs, the degree of nursing care required, and the likelihood of decubitus ulcers. Impaired sitting balance has a prevalence between 33 and 100%[4-6] depending on the degree of pelvic obliquity and scoliosis. A higher prevalence of impaired sitting balance may reflect studies involving more severely affected patients. However, Pritchett[6] suggested that achieving sitting balance is better determined by the efforts of nursing staff than the state of a patient's hips.

Difficulty with perineal care occurs due to severe adduction contractures at the hip, with or without hip pain. Moreau et al[5] and Knapp and Cortes[4] found a prevalence of 33% and 38% respectively. However, the prevalence of perineal care difficulty can vary depending on the number of patients who undergo corrective surgery.

Hip dislocation is a major problem for patients with SQCP and has been associated with hip pain,[1 2 5 7 9] scoliosis,[1 4 5] pelvic obliquity,[1 5] fracture,[6] and interference with ambulation.[3 7] The reported incidence in adults ranges between 25 and 75%.[1 4 7 9] Prevention and early intervention is the recommended treatment,[1 3 4] but reduction of an established dislocation is dependent on the severity of associated symptoms.

In patients with a dislocated or subluxated hip secondary to SQCP, pelvic obliquity and scoliosis frequently co-exist and have a prevalence between 41 and 71%[1 4-7] and 47 and 72%[1 4 5] respectively. This association is not thought to be causative,[1 6 10] but it does increase the more severely affected a patient is.[1] Unilateral hip dislocation is more frequently seen on the high pelvis side in patients with pelvic obliquity.[1 6 7 10]

The aim of this study was to review the prevalence of hip pain, hip dislocation, sitting balance difficulty, and perineal care difficulty in adults with SQCP as identified on the Capital Coast District Health Board (CCDHB) database.

## Method

A retrospective audit of patients diagnosed with SQCP

who had been admitted to Wellington Hospital between 1992 and 2003 was undertaken. Patients were identified through the CCDHB inpatient database and the Wellington Hospital Paediatric Department inpatient database using appropriate ICD 09 (1992-1998) and ICD 10 codes (1999-2003). The searches were limited to inpatients, as equivalent outpatient databases do not currently exist. Medical records were then checked to exclude deceased patients, those not diagnosed with SQCP, and those under 16 years of age. Patients were asked to complete questionnaires, with the aid of the main caregiver as appropriate. Patients preferring not to participate in the study were asked to return their questionnaire blank. Patients who did not reply were then contacted by telephone and the questionnaire completed in that manner.

The CCS Wellington office (formerly Crippled Children's Society), on behalf of researchers, also sent questionnaires to patients as identified on the CCS database. Patients who replied allowed researchers to access their medical records and thus confirm inclusion or exclusion from the study. There was no follow-up of patients who did not reply, as their contact details remained confidential to CCS.

## Results

A total of 197 patients were identified from the CCDHB database searches. Of those, 50 patients were confirmed to have SQCP and be over the age of 16. Of those 50 patients, 9 were deceased and 9 were unable to be contacted due to out-of-date contact details. Of the remaining 32 patients, 16 mailed completed questionnaires, 15 questionnaires were done by telephone, and one patient did not reply (reply rate = 97%).

Ninety patients were identified on the CCS database and sent questionnaires. Of those, 37 replied (41%) but only four patients were confirmed to have SQCP and included in the study. The remaining 33 patients were excluded (not spastic quadriplegic cerebral palso = 11, blank questionnaire = 11, too young = 6, already received questionnaire from Wellington Hospital = 4, incorrect address = 1).

The total number of SQCP patients in the study was 36 (CCDHB = 32, CCS = 4) of which 35 (97%) completed questionnaires. There were 17 males and 18 females, and the mean age was 25 (range 16-52). A total of 89% (31/35) of patients were non-ambulatory, 3% (1/35) required crutches and 9% (3/35) were able to walk without aids.

## Questionnaire results

43% (15/35) of patients suffered from current hip pain severe enough to interfere with regular daily activities. 43% had difficulty with sitting balance indicated by difficulty with being positioned in a chair.

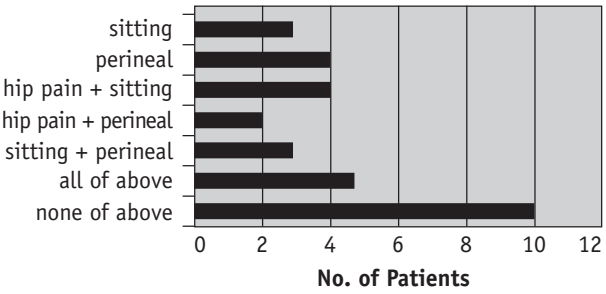


**Figure 1: Hip problems in spastic quadriplegic cerebral palsy patients.**

40% (14/35) of patients had difficulty with perineal care attributable to hip immobility.

Unmanageable pain was prevalent in 7% (1/15) of patients reporting hip pain. The remaining 93% of patients with current hip pain were adequately managed either with (5/15) or without (9/15) medication.

Multiple hip problems were reported by 40% (14/35) of patients as shown in Figure 1.

All the problems of hip pain, sitting balance difficulty and perineal care difficulty were experienced by 14% (5/35) of patients. In 29% (10/35) of patients, none of the above hip problems were prevalent.

Of the 15 patients with current hip pain, 60% (9/15) also experienced difficulty with sitting balance, compared to 30% (6/20) of patients without hip pain. This difference was not statistically significant (chi-sq = 3.15, df = 1, p = 0.076) and does not suggest an association between current hip pain and difficulty with sitting balance.

Of the 15 patients with current hip pain, 47% (7/15) also experienced difficulty with perineal care compared to 35% (7/20) of patients without hip pain. This difference is not statistically significant (chi-sq = 0.49, df = 1, p = 0.486) and does not suggest an association between current hip pain and difficulty with perineal care.

**Table 1: Types of hip surgery**

| Surgery Type | No. | % |
|---|---|---|
| girdlestone | 1 | 8 |
| proximal femoral resection | 3 | 25 |
| femoral osteotomy | 4 | 33 |
| soft tissue release | 2 | 17 |
| unable to remember | 2 | 17 |
| total | 12 | 100 |

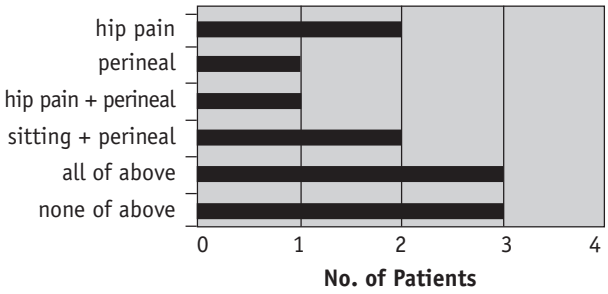


**Figure 2: Hip problems in surgery patients.**

Of the 15 patients that had difficulty with sitting balance, 53% (8/15) also had problems with perineal care compared to 30% (6/20) of patients without sitting difficulties. This difference was not statistically significant (chi-sq = 1.94, df = 1, p = 0.163).

Of the 35 patients in the study, 34% (12/35) were found to have had hip surgery. Of those patients, 83% (10/12) experienced hip pain prior to undergoing their hip surgery and all stated a reduction in hip pain post-recovery.

**Table 2: Current hip state in patients reporting a previous hip dislocation**

| | Self Report | | Radiograph | |
|---|---|---|---|---|
| patient | right hip | left hip | right hip | left hip |
| 1 | reduced | disloc | reduced | disloc |
| 2 | disloc | reduced | sublux | reduced |
| 3 | disloc | disloc | resected | disloc |
| 4 | disloc | reduced | resected | reduced |
| 5 | disloc | reduced | reduced | reduced |

NB: disloc = dislocated sublux = subluxated

**Table 3: Current hip state in patients not reporting a previous hip dislocation**

| | Self Report | | Radiograph | |
|---|---|---|---|---|
| patient | right hip | left hip | right hip | left hip |
| 1 | reduced | reduced | reduced | reduced |
| 2 | reduced | reduced | disloc | sublux |
| 3 | reduced | reduced | sublux | reduced |
| 4 | reduced | reduced | reduced | reduced |
| 5 | reduced | reduced | reduced | reduced |
| 6 | reduced | reduced | reduced | reduced |
| 7 | reduced | reduced | reduced | sublux |
| 8 | reduced | reduced | reduced | reduced |

NB: disloc = dislocated sublux = subluxated

Of the 12 patients who had surgery, 50% (6/12) had current hip pain, 42% (5/12) had difficulty with sitting position, and 58% (7/12) had difficulty with perineal care.

Of the patients who had surgery, 25% (3/12) currently suffer from all the problems of hip pain, difficulty with sitting balance and difficulty with perineal care. In another 25% (3/12) of patients, none of the above hip problems were prevalent.

The questionnaire results show that 37% (13/35) of patients reported having had a past hip dislocation. This involved the right hip in 54% (7/13) of cases, the left hip in 15% (2/13) of cases and both hips in 31% (4/13) of cases. The current state of a patients' hips – whether they be reduced, dislocated, subluxated or resected – was assessed by examining the patient's most recent hip radiograph. The radiographs of 16 patients were located and of these, 13 were radiographs of the hip.

Of the 13 patients who reported having had a previous hip dislocation, hip radiographs could be located for five of them. The current state of right hips was reduced in 40% (2/5), subluxated in 20% (1/5) and resected in 40% (2/5). The current state of left hips was reduced in 60% (3/5) and dislocated in 40% (2/5).

Of the 22 patients who did not report having ever had a hip dislocation, hip radiographs could be located for 8 of them. The current state of right hips was reduced in 75% (6/8), subluxated in 13% (1/8) and dislocated in 13% (1/8). The current state of left hips was reduced in 75% (6/8) and subluxated in 25% (2/8). This shows there was either a hip dislocation or subluxation in 38% (3/8) of patients who reported never having had a hip dislocation.

## Discussion

The aim of this study was to review the prevalence of hip pain, hip dislocation, sitting balance difficulty and perineal care difficulty in adults with SQCP. No association was found among these problems but they were found to affect a significant number of patients within the study population.

The prevalence of hip pain among adults with SQCP was 43%. This is comparable with other studies which report a prevalence between 29 and 47%.[2,4,6-8] It was found that 43% of patients also had impaired sitting balance. Again, this compares with the literature which reports between 33 and 100%,[4-6] depending on the degree of pelvic obliquity and scoliosis.

Difficulty with perineal care was reported by 40% of participants in this study. This is slightly higher than the 33% and 38% reported by Moreau et al[5] and Knapp and

Cortes[4] respectively. However, the incidence of difficulty in perineal care was influenced by whether the patient had surgical correction of their adduction contractures.

The reported incidence of hip dislocation in adults with SQCP ranged from 25% to 75%.[1479] No assessment of hip dislocation was possible in this study due to the unreliability of self-reported dislocation and lack of hip radiographs. The 37% of patients reporting a previous hip dislocation is likely to be an underestimate, because dislocated or subluxated hips were evident from radiographs of a further 38% of patients not reporting a previous hip dislocation.

All 12 patients who had previous hip surgery reported an improvement in pain post-recovery. However, the questionnaire showed that half of these patients currently experience hip pain, and 25% experience all the problems of hip pain, difficulty with sitting balance and difficulty with perineal care. Comparisons between patients with prior hip surgery and those without cannot be made, but it is important to note that many hip-related problems remain prevalent in both groups.

Obstacles complicating this study included patient identification, contacting patients, patient response, and interpreting medical records. Identifying patients with SQCP was difficult as "343.9 Infantile cerebral palsy, unspecified" and "G80.9 Cerebral palsy, unspecified" were the diagnosis codes most commonly encountered in the CCDHB databases. This forced the use of non-specific search terms to reduce premature exclusion from the study, and meant that medical records were necessary to confirm diagnoses of SQCP.

CCS clients were contacted through the CCS Wellington office to assess how effective the CCDHB database was at identifying patients with SQCP, and also to include any patients not yet identified. This was problematic as the coding system previously used by CCS did not differentiate between different types of cerebral palsy, and meant that questionnaires were sent to clients without SQCP.

Having identified 41 patients appropriate for inclusion in the study, nine were subsequently excluded because of out-dated contact details, and patient information outside the CCDHB database was inaccessible. Details of CCS clients are confidential to CCS, so patients could not be excluded before questionnaires were sent, and only patients returning questionnaires could be confirmed to have SQCP.

Many of the questionnaires were completed by telephone (47%), as the response by mail was poor (50%). Caregivers were often reluctant to answer on behalf of patients with significant communication difficulties. With their concerns acknowledged, caregivers were more willing to interpret patients' behaviour to answer the questionnaire.

Changes in caregiver also meant that the past medical history of some patients was incomplete. This may explain why some patients have radiographic evidence of a previous hip dislocation despite reporting the opposite. It was not possible to accurately assess the current state of patients' hips as only 16 patients had previous radiographs that could be located. Radiographs at Wellington Hospital are destroyed after seven years (adult) or when a patient reaches age 17 (paediatric). Written medical records did not prove a reliable way to assess the current state of a patient's hips.

There are several ways that the study could be improved.

1. Access to the databases of more district health boards would have provided a larger study population.
2. A better way of establishing patients' current contact details would further increase the study population and reduce selection bias.
3. Physical examination of patients would allow a more uniform and objective assessment of hip pain, sitting balance, and perineal care.
4. Radiographing the pelvis would provide information regarding current hip state, pelvic obliquity, and scoliosis. These could then be analysed for associations with each other and also with the symptoms of hip pain, perineal care difficulty, and sitting balance difficulty.
5. A prospective study into SQCP would improve patient diagnosis coding, ensure contact details were kept current, and monitor the long-term outcomes of medical and surgical treatments.

## Acknowledgement

The authors wish to acknowledge the Wellington School of Medicine Surgical Research Trust and Wakefield Hospital for their support of this study.

Han Truong is currently studying as a trainee intern at the Wellington School of Medicine and is a Medical Officer in the Royal New Zealand Army. Han's research into spastic quadriplegic cerebral palsy was part of a summer studentship in orthopaedics run through the Wellington School of Medicine Surgical Research Trust.

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