

The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynyk and Fineout-Overholt (2011).

- I Evidence obtained from a systematic review of all relevant randomised control trials.
- II Evidence obtained from at least one well designed randomised control trial.
- III Evidence obtained from well-designed controlled trials without randomisation.
- IV Evidence obtained from well designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series
- V Evidence obtained from systematic reviews of descriptive and qualitative studies
- VI Evidence obtained from single descriptive and qualitative studies
- VII Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

Melynyk, B. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing & healthcare: A guide to best practice (2nd ed.)*. Philadelphia: Wolters Kluwer, Lippincott Williams & Wilkins.

National Health and Medical Research Council (2009). *NHMRC levels of evidence and grades for recommendations for developers of guidelines* (2009). Australian Government: NHMRC.
http://www.nhmrc.gov.au/files_nhmrc/file/guidelines/evidence_statement_form.pdf

OCEBM Levels of Evidence Working Group Oxford (2011). *The Oxford 2011 Levels of Evidence*. Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/index.aspx?o=1025>

Part 2: Evidence Table

Rationale for development of Clinical Guideline:

Hip spicas are commonly used to immobilize hip and leg joints after surgical repair or trauma. Care of the child in a hip spica poses many challenges for nursing staff. Currently there is no clinical guideline at the Royal Children's Hospital to support nurses in their care of the child post hip spica application. Research has shown that both parents and health professionals feel the need for further information regarding hip spica care, therefore this guideline is necessary and has the potential to improve patient outcomes. Caring for the child in a hip spica requires thorough assessment skills, postoperative management and cast care. The implementation of an appropriate guideline has been shown to improve nursing knowledge and education and consequently improve patient outcomes in other institutions. Significant parental education and support is required during the discharge process emphasizing the need for nurses to have a detailed understanding of the care required.

Search Strategy:

The key terms 'plaster care' 'nursing' 'cast care' 'spica cast' 'hip spica' 'developmental hip dysplasia' were entered into the data bases both individually and in different combinations. The data bases utilised included The Melbourne University's Discovery search tool and CINAHL. Results were limited to the search period from 2002-2013 and English language. The search yielded 246 articles of which 32 were selected. Articles were excluded based on irrelevance. Further studies were identified by examining the reference lists of all included articles. In total 7 were selected for use in the evidence table and 14 relevant articles were included in the reference list.

Evidence Table:

Reference <i>(include title, author, journal title, year of publication, volume and issue, pages)</i>	Evidence level (I-VII)	Methods, key findings, outcomes or recommendations	Critical Appraisal of the Evidence <i>(consider study design and scope, methodological strengths and weaknesses etc)</i>
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<p>Clarke, S., & McKay, M. (2006). An audit of spica cast guidelines for parents and professionals caring for children with developmental dysplasia of the hip. <i>Journal of Orthopedic Nursing, 10</i>, 128-137.</p>	<p>VI Audit</p>	<ul style="list-style-type: none"> • An audit of parents and health professional’s information on spica cast care specific to children with DDH. • Baseline assessment using audit and questionnaire which can be then used in future to assess efficacy of clinical guidelines. • 73% of parents had to contact the hospital for advice or reassurance • Parents wanted troubleshooting information and general spica cast guidelines following discharge • Both groups needed the leaflet to include pictures <p>Implications for Guideline: Both health care professionals and parents need thorough education.</p> <p>An audited guideline which provides specific information regarding spica care for health professionals:</p> <ul style="list-style-type: none"> • Check the condition of the cast and skin regularly • Change position regularly-2 hourly during the day and 4 hourly overnight until the cast is dry and support with pillows • Nappies should be changed more regularly • The cast should be firm and fit snugly • When dry a reinforcing layer can be applied. • Eat smaller meals and place patient in upright position 	<p>Strengths</p> <p>Questionnaires were analysed using SPSS Following the audit a revised booklet was proposed which will follow with a post test- this could then provide health care workers with a standardized leaflet for spica cast guidelines. Good description of group characteristics which is important if the study is to be replicated and compared with implementation of a new guideline. The guideline used was found to be useful by 99% of staff therefore assessment and management guidelines clinically important. Most studies focus on education of parents therefore added focus on education of nurses provides more meaningful implications.</p> <p>Limitations</p> <p>Convenience sample of 44 parents and 44 health professionals Did not outline own limitations More detailed questionnaires regarding spica care i.e. how many were soiled, could have allowed greater comparison to follow up on the impact the guideline has in reducing complications and improving care. No discussion of interviewer bias or how they tried to reduce it. Responses from telephone interviews were not clearly transcribed or discussed in the analysis of data. Conclusive statements such as “confirmed to be necessary” were invalidly made Recommendation to develop new guideline very specific to institute and no findings generalized for other nursing areas.</p>
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<p>DiFazio, R., Vessey, J., Zurakowski, D., Hresko, M.T., & Matheney, T. (2011). Incidence of skin complications and associated charges in children treated with hip spica casts for femur fractures. <i>Journal of Pediatric Orthopaedics</i>, 31(1), 17-22.</p>	<p>III Retrospective Case control study</p>	<ul style="list-style-type: none"> • Retrospective study analysing all cases of spica cast placement for femur fractures treated at a major tertiary care children’s hospital between 2003-2009 • Final sample included 300 children. • 77 children experienced varying degrees of skin complications. • Of the skin complications; 81.8% caused by soiling, 5.2% by cast pressure, 1.3% foreign object, and 11% had no documented cause. • 24 of these children required a hip spica change in theatre • The median fee for a change of spica cast in theatre was a median 12,719 USD. • Significant predictors of skin complications were identified and included age below 2 years ($P<0.001$), presence of child abuse as the mechanism of injury ($P<0.001$), and spica cast placement ≥ 40 days (median) ($P=0.03$) • Skin complications are associated with significant financial cost • Future research needs to address ways to decrease the incidence of skin complications • Identified that higher risk in younger age associated with lack of toilet training and that parents may therefore benefit from additional teaching on diapering techniques and need to be encouraged to perform frequent diaper changes. <p>Implications: Spica cast treatment is associated with many skin complications highlighting the need for strict skin care and toileting during hospitalisation and appropriate parent education</p>	<p>Strengths Appropriate design choice Good use of statistical analyses to create meaningful findings. Univariate analysis was used to test association and multivariate statistics were applied to identify predictors of skin complications. Statistical significance was set a priori at 2-tailed P value less than 0.05. Case control study- Skin complications vs. no skin complications. Statistical analyses performed using SPSS 18.0 Characteristics are well described and representative of the population which enhances generalizability Strong discussion for implications to practice and good recommendations for practice as well as for further research.</p> <p>Limitations Single Centre study Unable to reveal causal relationships Did not discuss limitations to own study. Possibility that preexisting differences may be a plausible alternative explanation for any observed group differences on the dependent variable-no random selection therefore cannot exclude extraneous unknown factors for variance. Not discussed as limitation or discussed in interpreting results Study relies on medical documentation which can be unreliable No consent gained from participants or explanation of consent process or ethical considerations of using health records.</p>
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<p>Herman, M.J., Abzug, J.M., Krynetskiy, E.E., & Guzzardo, L.V. (2011). Motor vehicle transportation in hip spica casts: Are our patients safely Restrained? <i>Journal of Pediatric Orthopaedics, 31(4)</i>, 465-468.</p>	<p>IV Therapeutic study</p>	<ul style="list-style-type: none"> • 31 children recruited • Concluded that the majority of children in hip spica casts are not safely restrained when traveling in a car. • Of the 31 children only 31% were transported by the method recommended on discharge and therefore 69% were not properly restrained. • Limited financial resources of families were the primary reason for failing to use the correct restraint type. Use of a loan system or financial assistance may improve compliance. • Better parental education is needed to improve compliance <p>Implications: Many patients were not being safely restrained highlighting the importance of properly fitting the patient and educating the parents on using the appropriate restraint advised. Loaner programs help improve compliance with appropriate car seating method.</p>	<p>Strengths While limited encouraged other institutions to reassess the safety and efficacy of their car seating protocols</p> <p>Limitations Limited to the experience of the physiotherapist in fitting the child into the correct restraint. Small sample size limited to those patients being treated in a single urban pediatric hospital. The use of a validated questionnaire may have yielded more significant information that could have helped explain poor compliance further. A table would have illustrated descriptive statistics more effectively. Study identified patients were not being appropriately restrained but had little scope to make any recommendations from their findings.</p>
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<p>Newman, D.M., & Fawcett. (1995). Caring for a young child in a body cast: impact on the care giver. <i>Orthopaedic Nursing, 14(1)</i>, 41-46.</p>	<p>VI Landmark Study; Qualitative descriptive</p>	<ul style="list-style-type: none"> • Sample size of 30 mothers who were the primary care giver for a child in a hip spica. • Mothers found it impossible to continue usual household, social and community activities without the help of family members. • Mothers reported being “frightened,” “tired,” and “overwhelmed” • Mothers repeatedly cited the need for more information about caring for their child at home. • Mothers reported problems such as skin excoriation due to urine leakage, and odor and skin problems due to excretions seeping into casts. • Positioning and lifting were a problem for most mothers. Half of the mothers reported back aches, muscle pain and shoulder aches. • Appropriate car seat and wheel chair access issues were identified by mothers. • Significant feelings of social isolation expressed by mothers. <p>Implications: Caring for a child in a hip spica is stressful for parents. Nurses need to ensure parents have good family supports in place. Thorough parental education on cast care is essential. Study identifies importance of proper lifting. Nurses themselves need to ensure appropriate transferring of patient to prevent back injury and also need to educate parents on appropriate lifting. Physiotherapy or occupational therapy may be required. Incontinence issues and cast care are important issues in nursing care and education.</p>	<p>Strengths Identified the need for further qualitative studies to be conducted with larger sample sizes to verify or expand the findings of this study. Also identify the need for quantitative research to allow the examination of relationship between variables in adaptation as well as quantify care givers responses to create more meaningful inferences. Included a section highlighting the suggestions for nursing interventions. Use of open ended questionnaire yielded quality evidence Design also allowed for descriptive statistics to add meaning to the participant’s qualitative responses. While not statistically significant the findings offer rich detail to support the importance of nursing assessment and education in hip spica care.</p> <p>Limitations Study completed in 1995 however is referred to throughout recent studies in the area and provides excellent insight into parent’s perceptions of caring for child in a hip spica adding to nursing knowledge. Did not discuss effect of interviewer bias on participant’s responses. Variance between contexts of interview responses not discussed. Some participants interviewed by research assistant at the clinic some filled out the questionnaire and returned via mail with no questions by the interviewer and some were interviewed in their homes. The variances have the potential to influence responses. None of the tests were statistically significant due to the small sample size.</p>
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<p>Reed, C., Carroll, L., Baccari, S., & Shermont, H. (2011). Spica cast care. A collaborative staff led education initiative for improved patient care. <i>Orthopaedic Nursing, 30(6)</i>, 353-358</p>	<p>Exploratory VI</p>	<ul style="list-style-type: none"> • One of the most challenging aspects of caring for incontinent children in hip spicas is maintaining healthy skin integrity • Described the nurse led initiative to change practice in view of an increase in phone calls about and readmissions for rash, skin breakdown, and foul smelling casts. • Common practice throughout children’s hospitals for spica cast diapering included the use of an absorbable pad and tucked diaper. • Staff and parent education programs have potential to decrease incidence of skin breakdown. 	<p>Strengths Good description of literature review highlighting they had actually researched the topic in determining there was little evidence of best practice related to spica cast toileting and diapering Providing a detailed experience of successful nursing innovation provides an exemplar for improving patient care The article provides a model for further patient care quality improvement projects.</p> <p>Limitations Actual data on the number of increased calls or admissions would have created more meaningful findings and areas for further comparative research The audit on the efficacy of new guidelines was poorly explained. No information was given regarding the time period of follow up, or exact tools used in assessing efficacy Reported a decrease in phone calls about skin care issues however with no numerical data poor level of evidence. Conclusions reached did not reflect evidence shown in article ie Findings from this audit demonstrated a decreased incidence of skin breakdowns and readmissions. Overall focus shifted from analyses of skin care assessment to the effectiveness of the education and patient quality improvement initiative overall which was the main point in discussion and conclusion section.</p>
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<p>Sparks, L., Ortman, M.R., & Aubuchon, P. (2004). Care of the child in a body cast. <i>Journal of Orthopaedic Nursing</i>, 8, 231-235. doi: 10.1016/j.joon.2004.09.003</p>	<p>VII Expert opinion</p>	<ul style="list-style-type: none"> • Present information gained from literature, internet resources, the authors experience and parents of the child. • Practical advice for nurses and parents. • Parents need both verbal and written instructions from nurses. • It is extremely important to examine the child's skin at least twice a day. • Parents and nurses should assess child's circulation and sensation • The edges of the cast should be made smooth with waterproof tape. • The cast needs to be protected from urine and stool. • Need frequent nappy changes. • An inner pad should be tucked under the cast and covered with a larger nappy for babies. • Older children can use bedpans and bottles • Constipation can be an issue for the child in a body cast. • The child can be positioned supine, prone, or side lying and should be turned at least four times a day. • All children need to be secured properly when riding in automobiles. • Nurses need to consider the family's strengths, limitations and needs in providing discharge education 	<p>Strengths While limited in its evidence base this article provides a comprehensive guide on specific clinical assessment and care needs.</p> <p>Limitations Use of non-reliable sources i.e. yahoo search engine. Limited ability to generalize findings of article No critical appraisal of literature or different techniques Limited use of articles-only 5 reference articles. Unknown credibility of data, based on authors experience however no discussion of authors credentials. Poor validation of findings therefore should be used in conjunction with evidence based research</p>
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<p>Zielinski, J., Oliver, G., Sybesma, J., Walter, N., & Atkinson, P. (2009). Casting technique and restraint choice influence child safety during transport of body casted children subjected to a simulated frontal MVA. <i>The Journal of Trauma</i>, 66, 1653-1665. doi: 10.1097/TA.0b013e3181a4c0f4</p>	<p>IV Well designed cohort study with control group</p>	<ul style="list-style-type: none"> • Children fitted into casts may not fit into traditional car seats requiring alterations to the seat or restraint. • Study conducted to provide data describing the influence of a hip spica cast during transportation of small children in the event of a frontal motor vehicle accident. • In general traditional child restraints accommodate children in hip spica however the addition of the hips spica increases the majority of injury metric magnitudes. • Study demonstrated that there are varied effects on basic physiologic functions for body casted children based on the method of restraint. • Restraints which place the child forward facing with the face in proximity to the cast should be avoided • Based on mixed results of study unable to advocate or oppose different seating positions • Overall best performance for 12 month age was observed with traditional car seat or lying down with a lap and shoulder belt. However this would be catastrophic in a side on collision. • While unable to provide clear recommendations due to variability in results some results alarming in adverse effect on child and therefore still need to be acknowledged. <p>Implications: Specific instructions should be communicated to parents before discharge by the child seat technician to ensure proper fit and function during subsequent transport. Study unable to conclude the effect the presence of hip spica has on different restraints and how it impacts the child's safety, however highlights the vigilance needed in ensuring appropriate fitting of care seats.</p>	<p>Strengths Tested 2 hypothesis Used a control non casted dummy which previous studies lacked and allowed comparisons to be made showing that although both uncasted and casted children passed current standards casted children had an increased susceptibility to injury forces. Testing methods comply with the federal motor vehicle safety standards which are appropriately referenced. Provides suggestions for optimal method of casting to allow child to fit in a traditional car seat however acknowledges limitations of recommendations.</p> <p>Limitations Limited ability to generalize findings as car seats used specific to area manufacture availability. In answering the first hypothesis of the challenges faced when installing the car seat, method was obscure and not replicable. Based on assessors reports and didn't describe fitting process so that it could then be replicated. Only one individual's experience. "the following challenges were noted.." Wasn't clearly explained in method how this was tested nor was it mentioned as a limitation. Would have been more effective to assess and compare challenges faced by parents in safely securing the child in the car seat. They hypothesized that that the cast would increase the challenge of safely and correctly securing the child in the vehicle. Explanation of data analysis confusing. Limited to frontal collisions only Yes they found that it was challenging to secure a child with a hip spica however their single experience and method makes generalization to other centers difficult.</p>
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