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The Complications of Crutches - A Summary of a Systematic Review of the Literature

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Overview

Over 575,000 people are prescribed crutches each year in the USA¹, either **axillary** or **forearm** crutches (see figure 1). Each design has its problems however data is limited in terms of the complications their use can result in. This is a summary of a systematic review which provides a comprehensive overview of all the published complications associated with crutch use, irrespective of type or duration of use.

Key Findings

- Lack of a similar systematic review in the area
- The use of a crutch mobility aid is widespread without attention from the scientific community, in terms of clinical practice or design modifications.
- Crutch design remains almost, surprisingly, unchanged through time.
- Complications are possible, even in short term use.
- Complications are most likely underreported but when they do occur, can be very serious indeed (arm or hand amputation).
- Axillary crutches are significantly associated with injury incident.

Aims & Objectives

To raise awareness of health professionals who prescribe crutches. To motivate scientists to test current crutch designs and potentially come up with other designs, which are more effective and less traumatic for the patient.

Figure 1: Axillary and Forearm crutch



Background

Patients often complain of problems when using crutches for a variety of reasons. Clinicians lack the necessary information to adequately advise patients on the risks when using them. This is due to a lack of literature in the area of injury demographics related to crutch use. This initiated the necessity to conduct a thorough systematic search of the published literature to find out the current situation. No other systematic reviews have been published in the past. Therefore no point of reference or comparison could exist.

Methods

An online literature search was conducted for English language articles using **Medline** and **PubMed** with a combination of **MeSH** terms irrespective of year published. The bibliography and citation lists of all relevant articles were manually examined for further articles. Finally, the researchers conducted a manual search across an extensive number of libraries in the UK and Europe after all the available electronic resources were eliminated.

The systematic review included all original forms of study and trial design, including descriptive studies such as case reports or case series,

logical basis for the occurrence of the complication, any date of publication, irrespective of the age of the patients involved. They excluded papers written in languages other than English, and complications or adverse events while using crutches that were not directly attributable to the crutch. Each article included in the study was then examined for the year of publication, country of origin, type of study, number of patients, age of patients, crutch type used, duration of crutch use, follow up, outcome measures used and level of evidence.

Results

A total of 547 papers were initially identified. After initial filtering for relevance and duplication, this figure reduced to 46. Searching through bibliographies provided another 7 articles, creating an overall figure of 53. Exclusion criteria removed 11 articles resulting in 42 articles. All articles represented either case studies or case series and were all written retrospectively. The mean age of patients at the time of complication was 51.1 years old with a range of 11-84 years.

An examination of the duration of crutch use prior to complication diagnosis revealed that 17% occurred after short term use (< 2 month), 10% midterm use (< 1 year) and 71% after long term use (over 1 year).

Discussion

A first quick look at the results gives the impression that complications from crutches are not common. However, there is a relative poverty in the literature for complications due to crutches and this could be due to case reports becoming less publishable. The articles come from a 91 year time period (1922-2013) and originated from 16 individual countries. Crutches are the commonest **orthotic aid** used worldwide and it is estimated that 7 million people use them each year⁴. What is not discernible is the proportion of those who use them on a short-term basis and those who are now reliant on them permanently for support whilst moving. The literature search revealed 58 individual cases of complications over almost a century (with a further 7 articles which we could not find English full text versions). It is likely that the common complications associated with crutches are rarely reported, as they are usually non serious, e.g. **arthralgia** or **myalgia** of the upper limb are known to occur

frequently. Nonetheless, these seemingly trivial symptoms can have a dramatic influence on a user's quality of life.

There is some evidence that the injury pattern varies depending on the type of crutch that has been used, with 74% of complications associated with axillary crutches. The duration of the crutch usage determines the pattern but also the seriousness of the injury. Serious complications are clearly not common. Only one study describes a serious complication in 2 cases, where **axillary artery thrombosis** after prolonged crutch use led to subsequent amputation of the arm in one patient and the middle 3 digits in another³ patient.

No good quality studies exist. There are no prospective studies/trials investigating complications. Due to small sizes of the studies it was not possible to attempt to meaningfully combine or Meta-analyse the data. The criterion of excluding the studies that were not translated in English may have under-reported some types of injuries sustained with different crutch designs or complications occurring from other cultural backgrounds.

Future Research Areas

Given the shortage of data, it is probably impractical to determine the true incidence of complications. However, as complications occur mainly in subjects who are long term crutch users, identifying this group through a database to provide annual clinical assessment to record/avoid complications may be beneficial.

Future studies investigating subjects' habits when using crutches; training provided before use; and prescribing factors could be beneficial to provide further insight into areas where crutch design could be improved to avoid injuries and aid mobility.

Endnotes:

1. Russell, J. (1997). *Trends and differential use of assistive technology devices: United States, 1994*. *Vital And Health Statistics of the Centers for Disease Controlled Prevention/National Center for Health Statistics*, 292, 1–10
2. MedicalFAQ. http://www.medicalfaq.net/how_many_people_use_crutches_per_year_/ta-1360973 Brooks AL, Fowler SB. *Axillary artery thrombosis after prolonged use of crutches*. *The Journal of bone and joint surgery*. American volume. 1964;46:863–4.

Further Reading

For Glossary of terms visit <http://www.cege.ucl.ac.uk/arg/Pages/no4terminology.aspx>