

The Cochrane Musculoskeletal Injuries Group

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Science and technology relevant to orthopaedic practice have expanded rapidly in the last fifty years. This has been accompanied by information overload. The number of journals in which relevant material might be found is now numbered in hundreds; individual practitioners cannot read and make sense of all the material. Also, much of that material, although informative in other ways, does not help practitioners to make informed choices between alternative approaches. This poses challenges, not only for health professionals, but for health care planners and funders, who look to these professionals for advice on what services should be provided and how. Over the last decade, various initiatives have been established in most developed countries to identify clinically effective health care interventions. Many of these are collaborating internationally to prevent duplication, given the scale of the agenda. One important international effort to promote effective health care is the Cochrane Collaboration. This paper briefly describes the work of the Cochrane Musculoskeletal Injuries Group (CMSIG), draws attention to a range of electronic and other evidence sources which are also relevant to orthopaedic practice, and discusses some issues around the conduct of surgical trials.

Evidence-based orthopaedic practice—evaluating surgery

We currently believe that randomized controlled trials, properly conducted, provide the most

unbiased assessment of the risks and benefits of surgery. The focus on randomized controlled trials (RCTs) reflects the general acceptance that this study design, involving random allocation to the interventions under comparison, is best suited to provide evidence of which of the available interventions for any particular conditions is most effective (Sackett et al. 1991; Sackett et al. 1996, Sibbald and Roland 1998), or, if their effectiveness is similar, which is more cost-effective.

A majority of RCTs in the broad field of orthopaedics are concerned with prophylaxis against complications, and with rehabilitation problems, rather than with surgical procedures themselves, although the gap may be narrowing. It is recognized that there are some barriers to the conduct of randomized trials in surgery. Some orthopaedic surgeons feel that RCTs are not needed, and that the methodology is inapplicable. This, in common with other clinical areas, is true to some extent. Internal fixation and arthroplasty for displaced intracapsular hip fracture evolved without randomized trials, and the differences between either of these methods and the historical results of conservative treatment makes it extremely unlikely that there will ever be a viable trial of conservative versus operative treatment in this context. There have been four, however, for extracapsular hip fracture (Parker et al. 2002). Blinding of trial interventions is a particular issue. One cannot conduct a triple blind surgical trial—the surgeon will always know what operation was done. ‘Sham’ surgery is unethical in most circumstances, so there is

generally no placebo equivalent available in surgical trials. But it is certainly possible to conduct RCTs in which both patient and outcome assessors are blinded to the comparison—for example, the surgical approach to total knee replacement. Concealment of treatment allocation at trial entry is always possible. Thus, provided that selection bias is reduced by the use of robust randomization processes, ensuring that the allocation of a consenting person to one or other arm of a trial cannot be influenced by the surgeon or others conducting enrolment, randomized trials in surgery are perfectly feasible. A difficulty which has taxed a number of commentators is the role of surgical experience and technical ability in the outcome of a surgical procedure. Provided that adequate technical training is provided for new procedures, once a surgeon feels competent to conduct both old and new, the argument against randomization is weaker. In trials where many different surgeons enroll their patients as participants, stratification of randomization by surgeon should deal with inter-operator variation.

We argue that the main obstacles to the conduct of RCTs in surgery are the same as those perceived in every other branch of medicine (Prescott et al. 1999)—concern for patients, loss of personal autonomy, time pressures, lack of support, potentially detrimental impact on the doctor-patient relationship, and frequently, difficulty in reaching a position of equipoise, which is a precondition to randomization (Edwards et al. 1998). In fact, although there are areas of orthopaedic practice with few trials, there are others that are relatively well covered; a good example is the management of proximal femoral fracture. We do believe, though, that there is a need to consider whether more use can be made of the mass of published information from non-randomized comparative studies. Within the Cochrane Collaboration, a methods group is now exploring that issue.

Cochrane Musculoskeletal Injuries Group

The Cochrane Musculoskeletal Injuries Group produces systematic reviews of interventions used in the prevention and management (treatment and rehabilitation) of fractures, dislocations, and soft tissue injuries of the upper and lower limbs

(Madhok et al. 2000). The February 2002 issue of the Cochrane Library contained 29 protocols and 36 reviews produced by reviewers within the group, from fifteen countries. This represents a huge amount of work on the part everyone involved, yet it is really only a beginning.

The Cochrane Collaboration (www.cochrane.org) is an international, not-for-profit, organisation, established in 1992, that aims to help people make well-informed decisions about healthcare. The Collaboration is named after Archie Cochrane, a British Professor of Public Health, who wrote in 1979: "It is surely a great criticism of our profession that we have not organised a critical summary, by specialty or subspecialty, adapted periodically, of all relevant randomised controlled trials" (Cochrane 1979).

The preparation and maintenance of Cochrane reviews is the main work of Collaborative Review Groups, of which there are 50 in early 2002. The Collaboration has other entities – for example, Cochrane Centres, which are national or regional bodies providing support for reviewers, and Methods Groups, whose aim is to develop and disseminate improved methods of conducting and reporting reviews and meta-analyses.

Review Groups cover most of the important areas of health care. The members of these groups—health care professionals, researchers, people using the health services (consumers) and others across the world—share an interest in generating reliable, up-to-date evidence relevant to the prevention, treatment and rehabilitation of particular health problems or groups of problems. Each Review Group has an editorial team, which is international in composition, and members of the team co-ordinate and support the Group's activities. Many national and local bodies have given funds to support these groups but, in the main, the work of producing reviews is undertaken by volunteers. Reviewers are invited to register the work they intend doing and take it forward by submitting a protocol for editorial and external referee feedback, and then complete the review.

Peer-reviewed protocols and reviews from all the review groups are published in the Cochrane Database of Systematic Reviews (CDSR), which is available within The Cochrane Library, as a CD-ROM, and on the Internet (www.cochrane.org).

Table 1. Principles adopted in the production of a Cochrane review

- Careful a priori definition of the research question.
- Pre-defined inclusion and exclusion criteria for the types of studies, interventions, participants, and outcomes sought to answer the question.
- Comprehensive and explicit search strategy for primary studies.
- Detailed pre-defined methodological appraisal of, and data extraction from, included studies, by at least two reviewers.
- Standard reporting format.
- Support of reviewers by the Editorial Team throughout the process, from registration of a title, through production of a protocol, to publication of the completed review.
- Internal and external peer review of all protocols and reviews.
- Regular update of published reviews.
- A process for readers' comments and reviewers' replies.

The Cochrane Library is issued quarterly. The main commercial databases reference The Cochrane Library or CDSR.

The principles adopted in conducting a Cochrane review are listed in Table 1. Full guidelines on the preparation and maintenance of Cochrane reviews are regularly updated (Clarke and Oxman 2001). Software (Review Manager; REVMAN) is available to enter the reviews in a structured manner.

Using Cochrane reviews

Through summarising the evidence for healthcare interventions, these reviews make it easier for clinicians, policy makers, consumers and researchers to have access to a critical synthesis of current evidence on a wide range of topics. Rather than drawing conclusions from only a limited selection of primary evidence, or conducting a comprehensive search and appraisal oneself, it is becoming possible to have access to a range of reviews where the evidence has been found and thoroughly evaluated. Of course, there are and will always be questions for which a review does not yet exist. The situation is better, though, than it was a decade ago. The regular updating of Cochrane reviews, often to include more evidence but also to correct errors or respond to comment from readers, sustains this role. Many clinicians now make use of Cochrane

Table 2. Electronic review databases

The Cochrane Library contains several databases: • Database of Abstracts of Reviews of Effectiveness (DARE) • The Cochrane Controlled Trials Register (CENTRAL/CCRR) • Health Technology Assessment Database • The NHS Economic Evaluation Database • The Cochrane Methodology Register • About the Cochrane Collaboration Published quarterly by Update Software, Oxford on CD-ROM and the Internet. Distributed on a subscription basis and free to Cochrane contact reviewers. See http://www.update-software.com/cochrane/cochrane-frame.html for subscription details. This page can be displayed in numerous languages. Abstracts of Cochrane reviews are available and searchable without charge from this web address, including abstracts translated into Italian. CD-ROM version available in many libraries and workplaces. Also in libraries as part of other databases e.g. OVID's EBM Reviews which may contain: <i>Evidence-Based Medicine, ACP Journal Club, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effectiveness</i>. PEDro – The physiotherapy evidence database: http://ptwww.cchs.usyd.edu.au/pedro/ Contains most English-language randomised controlled trials and systematic reviews in physiotherapy and less comprehensive coverage of other languages.

reviews in their daily practice. Many more use practice guidelines which have drawn their recommendations from these and other high quality systematic reviews.

Searching for evidence and applying it to individual patients

The best sources of evidence change constantly in content and presentation. Internet sources come and go. Sources which CMSIG uses include:

- **Electronic review databases (see Table 2)**
The Cochrane Library, Best Evidence, PEDro – The Physiotherapy Database
- **Bibliographic databases and other internet sources (see Table 3)**
In English: MEDLINE, EMBASE, CINAHL, HEALTHstar, Current Contents, SPORT Discus.

Table 3. Bibliographic databases and Internet sources

MEDLINE, EMBASE, CINAHL etc. Need to use search filters for levels of evidence. Sports related databases: - available from SilverPlatter (WinSPIRS): SPORT Discus - an international database containing information on sports medicine, exercise physiology, biomechanics, psychology, training techniques, coaching, physical education, physical fitness, active living, recreation, history, facilities and equipment. ATLANTES - Spanish-language database containing bibliographic information on sport, physical activity, and leisure. HERACLES - French-language database containing bibliographic information on sport, physical activity, and leisure. LILACS - the most complete and frequently updated collection of databases of Latin American and Caribbean health literature. The Brazilian Cochrane Centre has adapted the optimal trial search strategy and it is available to copy and paste into the search form at 'How to search for clinical trials on LILACS': http://www.unifesp.br/suplem/cochrane/lilacs.htm SUMsearch - An evidence-based search engine: http://sumsearch.uthscsa.edu If you are short of time this is the solution. A simple search will produce good results. Good online assistance with searching. Useful limiting options: Therapeutics, Diagnostics, Prevention, Prognostics etc. Simultaneously searches texts, the National Guidelines Clearing House (US), The Cochrane Library, and PubMed (the NLM's free version of MEDLINE on the web). Results are displayed using hierarchy of evidence: Guidelines (sources of Guidelines that are based on systematic reviews are identified), systematic reviews (Cochrane), PubMed references (possibly systematic reviews), PubMed references (possibly RCTs). Active link to full text articles where available. TRIP database - evidence based medicine search engine: http://www.tripdatabase.com/ Current Controlled Trials: http://www.controlled-trials.com/	Search mRCT, a meta-register of 23 registers of ongoing and recently completed trials in all areas of healthcare. Have to become a registered user, but at no cost. University of Sheffield School of Health Related Research - Netting the Evidence: http://www.shef.ac.uk/~scharr/ir/netting/ The most comprehensive introduction to evidence based resources on the internet. Spanish language version at: http://www.infodocor.org/rafa bravo/netting.htm Arizona Health Sciences Library - Evidence Based Health Care Resources: http://www.ahsl.arizona.edu/guides/topics/EBHC.cfm Many useful active links. Cairns Library, University of Oxford, Faculty of Clinical Medicine home page: http://www.medicine.ox.ac.uk/cairns/ Select 'Evidence Based Practice' for links to many useful resources. University of York, NHS Centre for Reviews and Dissemination - home page: http://www.york.ac.uk/inst/crd/ Primary Care Clinical Practice Guidelines - Musculoskeletal Guidelines: http://medicine.ucsf.edu/resources/guidelines/guide13.html Exeter Medical Library links to sources of practice guidelines: http://www.ex.ac.uk/library/eml/guidelin.html American Academy of Orthopedic Surgeons annual meeting abstracts: http://www.aaos.org/wordhtml/libscip.htm Select 'Search' and use 'Randomised' to identify trials. Orthopaedic Trauma Association Annual Meeting abstracts and posters: http://www.hwb.org/ota/am/index.html Have to search to find trials. Acta Orthopaedica Scandinavica abstracts: http://home.pi.se/actaorthopscand/actanews.html A valuable source of randomised controlled trials.
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In other languages: LILACS, ATLANTES and HERACLES.

Conclusion

Increasingly answers to the problems of providing good quality health care in a cost-effective manner will come from systematic enquiries and through the combined efforts of clinicians and researchers. National and international multi-centre ran-

domized controlled trials offer the opportunity to reach adequate study sizes more quickly, and to extend the generalisability of results. In the field of musculoskeletal disease and injury there are many opportunities for individual practitioners to contribute to the growth of the body of valid evidence, by participation in ethical RCTs, and in the production of reviews.

Readers interested in learning more of the work of the Cochrane Musculoskeletal Injuries Group can contact corresponding author, or the

review group coordinator, Leeann Morton, at www.otago.ac.nz/cmsig, or by e-mail at cmsig@stonebow.otago.ac.nz.

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