SPX302
Evidence Based Practice & Levels of Evidence

Roger Carter
Faculty Librarian

Source: www.wpclipart.com
My case study: How do I treat this client?

• Any decision to treat should be based on the best evidence available
• This evidence will normally come from the published literature
• The clinical literature has been classified into various hierarchies of evidence
• Very important: Using Levels of Evidence does not preclude the need for careful reading, critical appraisal and clinical reasoning when applying evidence

This is a recent detailed widely accepted hierarchy developed by the Joanna Briggs Institute and the University of Adelaide
One Hierarchy of Evidence: based on study designs of papers: This is a much simplified version of the JBI hierarchy

<table>
<thead>
<tr>
<th>Rank</th>
<th>Methodology</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Systematic review, meta-analysis</td>
<td>Systematic review: review of a body of data that uses explicit methods to locate primary studies, and explicit criteria to assess their quality. Meta-analysis: systematic review that uses statistical methods to combine data, and analyse and summarise the results of the studies included.</td>
<td>Cochrane Collaboration</td>
</tr>
<tr>
<td>2</td>
<td>Randomised controlled trials (RCT)</td>
<td>Experiment in which individuals are randomly allocated to either a control group or a group that receives a specific intervention. Randomisation reduces the likelihood of bias. The strength of evidence is considerably boosted by the presence of at least one properly designed RCT of appropriate size.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cohort study</td>
<td>Evidence from well-designed trials without randomisation. Cohort study: observational study in which a defined group of people (the cohort) is followed over time. The people are selected on the basis of their exposure to a particular agent and followed up later for specific outcomes.</td>
<td>Articles published in peer-reviewed research journals</td>
</tr>
<tr>
<td>4</td>
<td>Case-control studies</td>
<td>Evidence from well designed trials without randomisation. Case-control study: study that compares people in two groups with and without a specific condition or disease, all taken from the same population. Usually analysed retrospectively.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cross-sectional survey</td>
<td>Survey or interview of a sample of the population to measure the distribution of interest at a particular point in time.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Case-report</td>
<td>A report based on a single patient or subject.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Expert opinion</td>
<td>Consensus of experience and opinions from respected authorities, based on clinical evidence, descriptive studies or reports from committees.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Anecdotal</td>
<td>Informal account of evidence in the form of an anecdote or hearsay, e.g. “My granny says the best treatment is to rub it with onions”. The term “anecdotal evidence” is often used in contrast to “scientific evidence”. Anecdotal evidence focuses on experience rather than more formal scientific evidence.</td>
<td>Source of informal verbal communication</td>
</tr>
</tbody>
</table>

Examples of articles showing different levels of evidence

The following eight slides show one example from each of the 8 levels noted on the last slide...from best to worst, and a note on where they were found.

Note especially that all examples from 1-7 are from peer-reviewed journals, but the quality of evidence declines greatly as the evidence level number rises!

Note: Good studies will usually indicate the type of Study Design in the Abstract of the paper, or even the title.
Exercise for osteoarthritis of the knee

Malene Fransen1, Sue McConnell2

1Faculty of Health Sciences, University of Sydney, Sydney, Australia. 2Department of Medicine, St Joseph’s Health Care Centre, Toronto, Canada

Contact address: Malene Fransen, Faculty of Health Sciences, University of Sydney, Room 0212, Cumberland Campus C42, Sydney, New South Wales, 2052, Australia. m.fransen@unsw.edu.au. (Editorial group: Cochrane Musculoskeletal Group)


Abstract

Background

Biomechanical factors, such as reduced muscle strength and joint misalignment, have an important role in the initiation and progression of knee osteoarthritis (OA). Currently, there is no known cure for OA; however, disease-related factors, such as impaired muscle function and reduced fitness, are potentially amenable to therapeutic exercise.

Objectives

To determine whether land-based therapeutic exercise is beneficial for people with knee OA in terms of reduced joint pain or improved physical function.

Search strategy
Rank 1

- Systematic review – review of a body of data that uses explicit methods to locate primary studies and explicit criteria to assess their quality
- Meta analysis – systematic review that uses statistical methods to combine the data and analyse and summarise the results
Executive Summary

Randomised controlled trial of the cost-effectiveness of water-based therapy for lower limb osteoarthritis

T. Cochrane, 1,2* R. Davey 1 and S.M. Matthes Edwards 2

1 Faculty of Health and Sciences, Staffordshire University, Stoke-on-Trent, UK
2 Exeter Primary Care Trust, Exeter, UK

* Corresponding author

Objectives

The objectives of the present study were:

- to determine the efficacy of community water-based therapy for the management of lower limb osteoarthritis (OA) in older patients: does the treatment work if taken by the recipients?
- to assess the cost-effectiveness of such an approach: is the treatment effective and is it cost-effective in practice?
- to establish the implications of delivering and sustaining a community-based water exercise programme for older patients with lower limb OA.

Methods

Design

A pre-experimental matched-control study was used to estimate efficacy (over 12 weeks only) of water-based exercise treatment, to check design assumptions and delivery processes. This was followed by the main study, a randomised controlled trial (under pragmatic conditions pertaining to general practice and community settings in North Staffordshire, UK) of the effectiveness of water-based exercise (treatment) compared with usual care (control) in older patients with hip and/or knee OA. The latter was accompanied by an economic evaluation comparing societal costs and consequences of the two treatments.

Setting

Water exercise was delivered in public swimming pools. Five different venues were used, one in the preliminary and four in the main study. Patients were prescribed group sessions twice weekly from a total choice of three (preliminary study) or ten (main study). Physical function assessments were carried out in established laboratory settings.

Participants
• RCT - Individuals are randomly allocated either to a control group, or a group that receives a specific intervention. Randomisation reduces the likelihood of bias.
Non-randomized, prospective, multi-centre evaluation of the ABSOLUTE .035 peripheral self-expanding stent system for occluded or stenotic superficial femoral or proximal popliteal arteries (ASSESS Trial): acute and 30-day results


Aim. The aim of the paper was to investigate the performance of the ABSOLUTE .035 Peripheral Self-Expanding Stent System in preventing restenosis of superficial femoral or proximal popliteal arteries. Due to a lack of large controlled trials proving its long-term durability femoropopliteal artery stenting is still a matter of debate. In this paper we report the study design, the acute and short-term results of a prospective European registry on the treatment of TASC B and C femoropopliteal lesions with the use of the ABSOLUTE stent.

Methods. This prospective, non-randomized, multi-centre study enrolled 122 patients with symptomatic peripheral occlusive disease at 14 sites in Europe. Patients were included with obstructed femoropopliteal arteries. Key

1Department of Angiology
Herz-Zentrum Bad Krozingen
Bad Krozingen, Germany

2Papageorgiou Hospital, Thessaloniki, Greece

3Herzzentrum Leipzig, Leipzig, Germany

4Aligemeines Krankenhaus der Stadt, Wien, Austria

5Duplex and Angiographic Core Lab, Loos, France

6Landeskranhaus, Klagenfurt, Austria

7Policlinique Louis Pasteur, Essey-les-Nancy, France

8Policlinico San Matteo, Pavia, Italy

9Nuovo Ospedale Civile Sant’Agostino, Modena, Italy

10Abbott Vascular International BVBA, Diegem, Belgium

11Universitäts Herz- und Gefäßzentrum
Hamburg, Germany
• Cohort study – observational study where a group of people is followed over time. Selected for their exposure then followed up later for specific outcomes.
Effect of *T’ai Chi Chuan* Training on Cardiovascular Risk Factors in Dyslipidemic Patients

Ching Lan, M.D.,¹ Ta-Chen Su, M.D., Ph.D.,² Ssu-Yuan Chen, M.D., Ph.D.,¹ and Jin-Shin Lai, M.D.¹

Abstract

*Objective:* *T’ai chi chuan* (TCC) is a traditional Chinese exercise and is beneficial for health. Nevertheless, its effect on cardiovascular risk factors in dyslipidemic patients is not clear. The aim of this study was to evaluate the effect of TCC training on coronary heart disease (CHD) risk factors in patients with dyslipidemia.

*Design:* This was designed as a case-controlled study.

*Setting:* The study was conducted in a community setting.

*Subjects:* Fifty-three (53) patients (males: 24; females: 29) with dyslipidemia completed this study.

*Interventions:* The TCC group included 28 patients who participated in a 12-month *yang* TCC training program. The usual-care group included 25 patients who maintained a sedentary lifestyle during this study.

*Outcome measures:* Exercise testing was conducted at baseline and after 1 year of training. Body composition, lipid profile, fasting glucose and insulin levels, and inflammatory markers were also measured before and after training.

*Results:* After training, the TCC group showed an increase in VO₂max from 25.2 ± 12 to 27.4 ± 11...
• Case control study – evidence from well designed trials without randomisation

Compares 2 groups with and without a particular condition, from the same population. Usually analysed retrospectively.
What factors are associated with physical activity in older people, assessed objectively by accelerometry?

T J Harris,¹ ² C G Owen,¹ C R Victor,³ R Adams,² D G Cook¹

ABSTRACT
Objectives: To assess physical activity (PA) levels measured objectively using accelerometers in community-dwelling older people and to examine the associations with health, disability, anthropometric measures and psychosocial factors.

Design: Cross-sectional survey.

Setting: Single general practice (primary care centre), United Kingdom.

Participants: Random selection of 560 community-dwelling older people at least 65 years old, registered with the practice. 43% (238/560) participated.

Assessment of risk factors: Participants completed a questionnaire assessing health, disability, psychosocial factors and PA levels; underwent anthropometric assessment; and wore an accelerometer (Actigraph) for 7 days.

Main outcome measures: Average daily accelerometer

if strolling, 2 mph, moderate-intensity if faster) remains important for maintaining activities. Factors associated with decreased PA levels in older people include: increasing age; female gender; obesity; medical problems; disability; pain; depression; smoking; reduced education; social isolation; low exercise self-efficacy; attitudinal barriers; bad weather; and unsafe neighbourhoods. These findings are from self-reported activity; however, the predominant activity, walking, is reliably recalled. Questionnaires also suffer from recall bias and floor effects, with the baseline too high for most respondents. Motion sensors (pedometers and accelerometers) are sensitive to walking, objectively quantify PA as a continuous variable and are unrestricted by floor values. Pedometers are cheap and easy to wear; they measure step-count but not intensity and therefore

¹ Division of Community Health Sciences, St George’s, University of London, London, UK; ² Sonning Common Health Centre, Sonning Common, UK; ³ School of Health & Social Care, Reading University, Reading, UK

Correspondence to:
Dr Tess Harris, Senior lecturer in general practice, Division of Community Health Sciences, St George’s, University of London, Cranmer Terrace, Tooting, London, SW17 0RE, UK; tharris@sgul.ac.uk

Accepted 3 April 2008

Published Online First.
• Cross sectional survey – measures the distribution of a thing at a particular point in time
CASE REPORT

Water and land based rehabilitation for Achilles tendinopathy in an elite female runner

A G Beneka, P C Malliou, G Benekas

CASE REPORT

A 17 year old female athlete presented with Achilles tendinopathy. A protocol of water and land based rehabilitation was designed to achieve non-weight bearing and pain free activity, so that she could rapidly return to her event (400 m hurdles). After three weeks, she returned to regular training, and after a further three weeks she successfully competed in a 400 m hurdle event. She has been able to compete at national level symptom free for the last 18 months.

• Case Report - Report based on a particular subject/client
Air travel and venous thromboembolism
Shanthi Mendis,¹ Derek Yach,² & Ala Alwan³

Abstract There has recently been increased publicity on the risk of venous thrombosis after long-haul flights. This paper reviews the evidence base related to the association between air travel and venous thromboembolism. The evidence consists only of case reports, clinical case-control studies and observational studies involving the use of intermediate end-points, or expert opinion. Some studies have suggested that there is no clear association, whereas others have indicated a strong relationship. On the whole it appears that there is probably a link between air travel and venous thrombosis. However, the link is likely to be weak, mainly affecting passengers with additional risk factors for venous thromboembolism. The available evidence is not adequate to allow quantification of the risk. There are insufficient scientific data on which to base specific recommendations for prevention, other than that leg exercise should be taken during travel. Further studies are urgently needed in order to identify prospectively the incidence of the condition and those at risk.

Keywords Aircraft; Travel; Venous thrombosis/etiology; Thromboembolism/etiology; Causality; Risk factors; Epidemiologic studies (source: MeSH, NLM).

Mots clés Navigation aérienne; Voyage; Thrombose veineuse/étiologie; Thrombo-embolie/étiologie; Causalité; Facteur risque; Etude analytique (Épidémiologie) (source: MeSH, INSERM).

Palabras clave Aeronaves; Viaje; Trombosis venosa/etiología; Tromboembolismo/etiología; Causalidad; Factores de riesgo; Estudios epidemiológicos (fuente: DeCS, BIREME).

Also in Rank 7- Lab/Animal Models  (Found using : Pubmed)

Looks promising but this is a long way from evidence that it should be used to treat a human patient!
Rank 7

• Expert Opinion - Consensus of experience and subsequent opinions based on clinical evidence.

• Animal models and laboratory studies - these may eventually lead to an actual treatment, but a lengthy protocol of clinical trials and approvals is required to move from this experimental evidence to eventual human treatment.
Rank 8 – Anecdotal Evidence

(Found using: Health Source: Consumer Edition, the article is from the magazine *American Fitness*)

Note: Info at this Level is not ‘wrong’ necessarily, but does not fulfill the Criteria on which to base serious decisions on patient or client welfare! Further evidence needed to back up the claims here.
• Anecdotal evidence – informal account focuses more on experience than formal science. These treatments might actually work (or not). Where is the evidence?
How can I find EB articles?

Cochrane Library only contains the highest level EB resources Systematic reviews and meta-analyses

• Cochrane can also be searched through PubMed’s Advanced Search screen
How can I find them?

The **CINAHL** database has a handy ‘Evidence Based’ button or tab to limit to these articles.

In other databases you can often add the search term “evidence based” or “RCT” etc to apply a rough filter to your results. Many EB articles include these words in the title or indexing.

The **TRIP** database harvests its data from PubMed and allows you to do a PICO search. It also displays its results by types of evidence e.g. RCTs.
What is PubMed?

• PubMed is the most comprehensive database indexing the journal literature of medicine and most related allied health fields. (No books, reports, DVDs or other types of publication)

• Produced by the U.S. National Library of Medicine

• Free for anyone to search online

• You can use Pubmed after you graduate and go to work, or where you cannot access other databases

• MEDLINE is another database derived from PubMed, but lacking very recently added articles (known as pre-Medline content). You can search it at USC via the Web of Knowledge

• All PubMed content should also be indexed in the SCOPUS database, which is also available at via USC Library
My case: I have a young female runner with a very sore Achilles tendon.

- Put this as a “clinical question”:

  “What treatments for Achilles tendinopathy in adolescent runners have the best outcomes?”

- (Note the clinical question posed in the form of an hypothesis that is testable)
Reformulate the question in PICO form

- **Patient**: Adolescent female runner
- **Intervention**: Any Achilles tendinitis therapy
- **Comparison**: None
- **Outcome**: Painfree achilles/ resolution of presenting problem
Use PICO to start formulating a Pubmed Advanced search

Now decide on your search terms and enter in Search Builder…

Hide index list after term entry- click Search
• Narrow your results if needed using “facets”
Narrow by “level of evidence” is needed...

• Narrow your results if needed using “facets”
• Click a link to view abstracts and *Link-out*
Effects of strength training aided by electrical stimulation on wrist muscle characteristics and hand function of children with hemiplegic cerebral palsy.

Vaz DV, Mancini GC, da Fonseca ST, Arantes NE, Pinto TP, de Araújo PA.

Physical Therapy Department, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil. danelevvaz@gmail.com

Nine children with spastic hemiplegic cerebral palsy underwent 24 sessions of wrist muscles strengthening in the extended wrist range aided by electrostimulation. Isometric strength of flexors and extensors was registered in three wrist positions (30 degrees of flexion, neutral, and 30 degrees of extension) to infer on angle-torque curves. Passive stiffness of wrist flexors and wrist flexion angle during manual tasks and hand function were also documented. Significant strength gains were observed at 30 degrees of wrist extension for flexors (p = 0.020) and extensors (p = 0.024). No gains were observed at 30 degrees of flexion. The difference in extension strength between the three test positions changed after intervention (p = 0.034), suggesting a shift in the angle-torque curve. No changes were observed in passive stiffness (p = 0.506), wrist angle (p = 0.586), or hand function (p = 0.525). Strength training in specific joint ranges may alter angle-torque relationships. For functional gains to be observed, however, a more aggressive intervention and contextualized task training would probably be needed.

PMID: 19042474 [PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms

LinkOut - more resources

Abstract

Full-text availability

These are often very relevant!
Abstract
Nine children with spastic hemiplegic cerebral palsy underwent 24 sessions of wrist electrostimulation. Isometric strength of flexors and extensors was registered in the extension to infer on angle-torque curves. Passive stiffness of wrist flexors and wr documented. Significant strength gains were observed at 30 degrees of wrist exten observed at 30 degrees of flexion. The difference in extensor strength between the suggesting a shift in the angle-torque curve. No changes were observed in passive 0.525. Strength training in specific joint ranges may alter angle-torque relationship intervention and contextualized task training would probably be needed.

PMID: 19042474 [PubMed - indexed for MEDLINE]
What if it doesn’t work??!! (...it happens sometimes)

• If none of these Full Text links takes you to the full article, search the journal title in USC Library’s Journals Titles list

• This is the most authoritative list of USC’s electronic journals...if it’s not there, we probably don’t have access!
Evidence based studies

Health professionals should base their decisions on good evidence.

Systematic reviews, meta-analyses and RCT’s (randomized controlled trials) are usually regarded as the best forms of evidence

• Remember that PubMed has **Limits** that allow you to narrow your search to different types of evidence-based studies- RCTs, case studies, etc.
Finding evidence-based studies

PubMed is just one source of EB studies:
Try these as well:
• CINAHL
• Informit Health (uses MeSH terms)
• Cochrane Library
• OTSeeker
• PEDRo
More info?

• Try the PubMed tutorials: http://www.nlm.nih.gov/bsd/disted/pubmed.html

Librarians are here to help:

– In person at the Library InfoDesk
– By phone (07) 5430 2803
– Online infodesk@usc.edu.au

Faculty Librarian: Roger Carter 5456 5095

HEIDI Drop-in
rcarter@usc.edu.au

http://libguides.usc.edu.au/sport

Last Updated July 2013
HELDi
Health Education Information drop in

What?
Help with assignment writing
Writing style
Assignment structure
Consult: Lecturers; Academic Skills

Advisor; or Librarian
Finding journal articles
Referencing

When? Semester 2, 2015
Every Thursday of teaching weeks
11am – 1pm

Where?
UniClub (Near tennis courts)