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Asepsis in clinical procedures

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Objectives

- Define asepsis and cleanliness applied to clinical procedures
- Apply the principles of evidence-based practice to aseptic and clean techniques
- Describe the program of research undertaken with the Royal College of Nursing in the UK exploring nurses' understanding of asepsis and ways of improving practice

Asepsis

- Asepsis: complete absence of micro-organisms
- Aseptic technique: methods used ensure absence of micro-organisms
- Equipment & fluids must be sterile (free of vegetative micro-organisms & spores)

ASEPTIC TECHNIQUE: USES

- Clinical procedures to promote patient safety
- Manufacture of clinical items
- Laboratory procedures: taking samples, preparing cultures

Asepsis and clinical procedures

- By convention internal organs & body fluids are regarded as free of micro-organisms
- Latest research: internal organs & body fluids have their own microbiomes and may also contain some contaminating micro-organisms
- BUT the micro-organisms in the microbiome are not pathogenic
- AND the contaminating micro-organisms are present in small numbers & dealt with by the immune system
- Conducting healthcare procedures aseptically is necessary to keep pathogenic micro-organisms out

Aseptic technique

- Central to clinical practice
- Key to patient safety
- Taught at an early stage in all nursing courses
- Very little research (Haesler 2016)
- We all assume we know what it is
- Look at any nursing textbook/resource: it describes the procedure, not the principles
- Taught in relation to procedures e.g. injections, dressing changes. The principles of asepsis receive little emphasis (Hawker et al 2022)
- Acute settings: no doubt
- Long term care concern & controversy

Aseptic technique: downsides

- Sterilization of consumables is expensive: healthcare costs
- Sterilization carries a heavy carbon footprint: planetary health
- Aseptic procedures can be complex and time-consuming: nursing workload at a time of global nursing shortages
- Complicated to teach & assess: students, unqualified workers, patients/carers

Alternative: clean technique

- Cleanliness: physical absence of visible contamination (e.g. dirt, debris, organic matter)
- Clean technique: methods used reduce contamination/micro-organisms
- Faster & cheaper
- Traditionally used for care of wounds already likely to be contaminated e.g. leg ulcers, pressure ulcers
- Is it safe? → What is the evidence to underpin aseptic vs. clean technique?

Appling the principles of evidence-based practice (EBP)

- EBP: finding & using evidence necessary to make clinical decisions
- Concept originated from the work of Sackett in 1970s
- Originally applied to epidemiology & since adopted by other disciplines
- Cornerstone of EBP: using a hierarchical system to classify different types of evidence
- Hierarchy is called Levels of Evidence/Evidence Pyramid
- The higher up the hierarchy, the more robust the evidence is taken to be
- Goal: use the best evidence possible to underpin practice, taking into consideration the individual's needs

Evidence-based practice movement

- Arose from the work of Archie Cochrane dating from 1960s
- Conceived to encourage uptake of healthcare interventions that are effective
- Intended to replace rituals, custom & practice → outmoded practice wastes time, money & could be harmful e.g. wounds heal best when kept dry
- Intended to improve patient care
- Avoid wasting time & money
- Resulted in Cochrane & systematic reviews

Example of ritual in nursing practice: the lead lotion incident

- Questioning current practice is a good thing to do
- Everything depends on how you do it
- Your status is important too!

Bohler Braun Splint

Bohler Broun 3 pulley splint

1. Proximal pulley to privent foot drop
2. 2nd pulley – traction in line with femur
3. 3rd pulley – traction in line with the leg

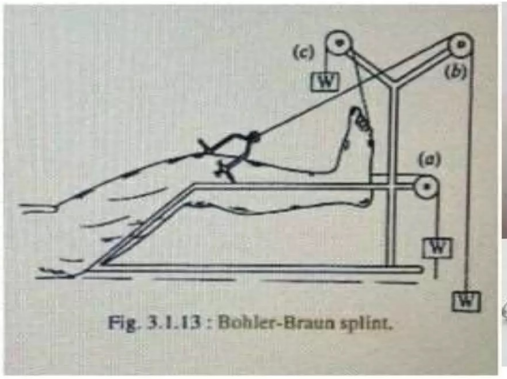
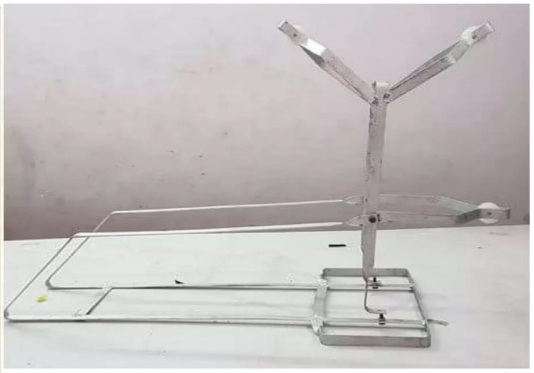
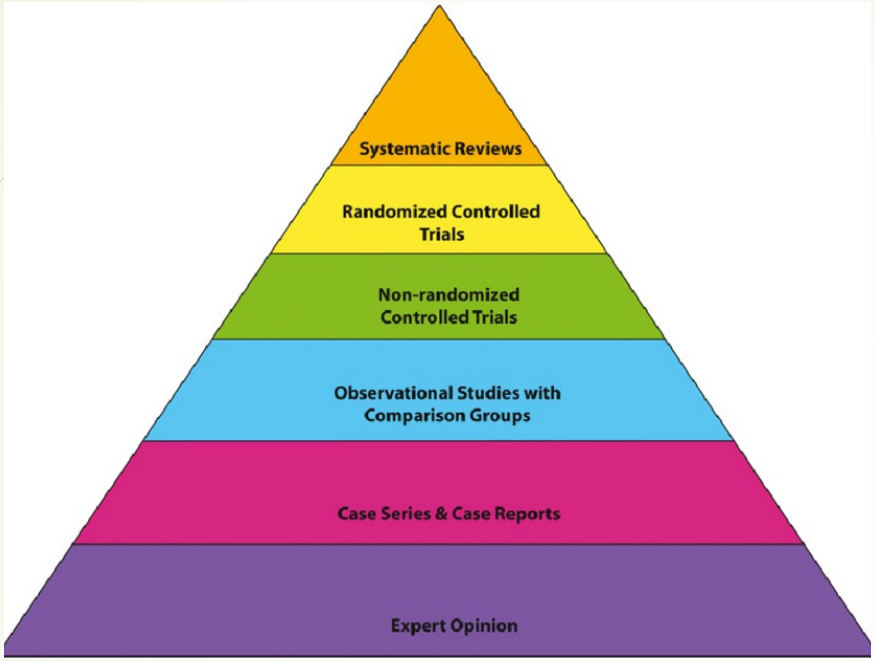


Fig. 3.1.13 : Bohler-Braun splint.



Levels of evidence

- Meta-analysis & systematic reviews of trials: strongest
- Individual randomized controlled trials (RCTs)
- Other types of trials: 'quasi experimental' study designs without randomization & interrupted time series studies
- Other quantitative studies without intervention e.g. cohort studies, case study series
- Qualitative approaches, expert opinion, consensus groups: weakest



Evidence pyramid

Classic 2-arm RCT

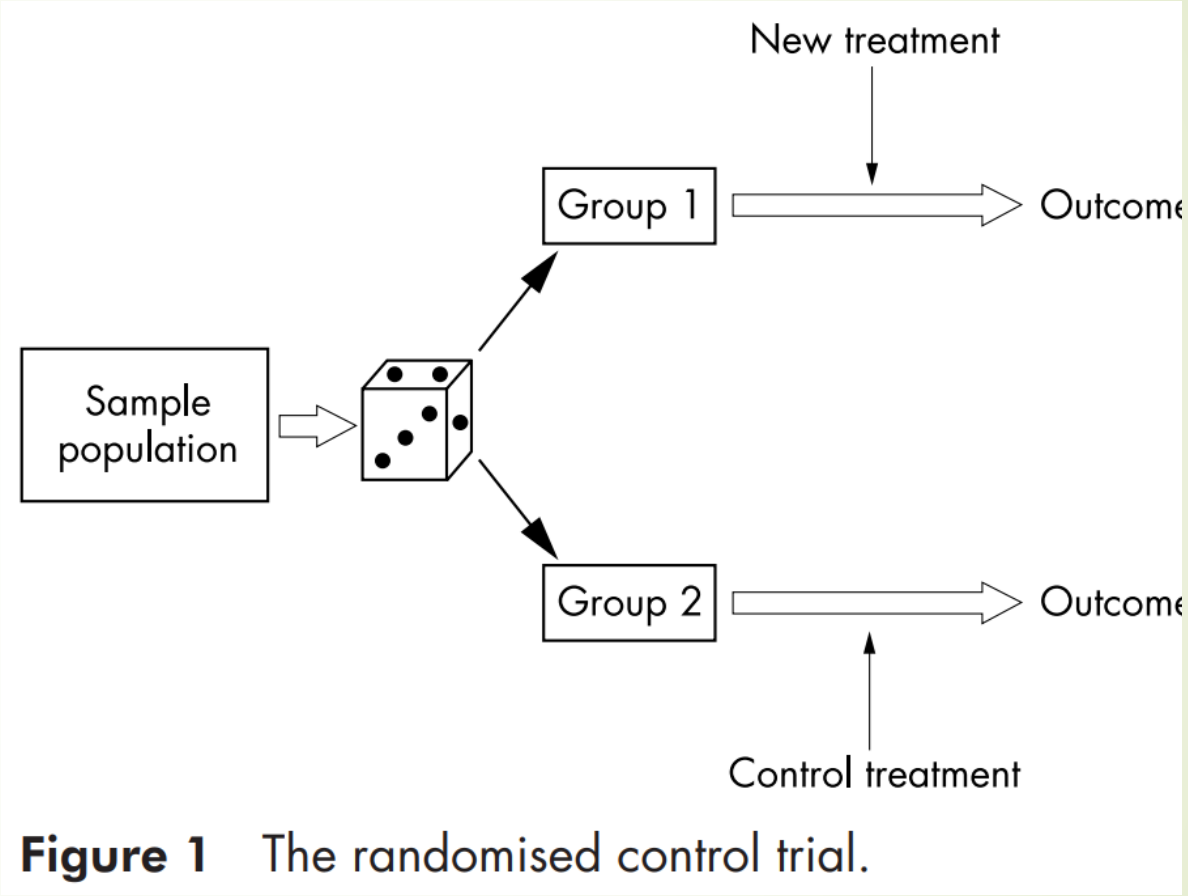


Figure 1 The randomised control trial.

Aseptic technique: is there an evidence base?

- Systematic review by Haesler et al 2016
- Astonishing lack of high-quality research to underpin the conduct of aseptic procedures

SUGGESTIONS

- Apply fundamental principles of microbiology
- Obtain expert opinion

Why aren't there any RCTs to support aseptic technique?

- Aseptic technique isn't a single procedure: lots of of different types of procedures requiring asepsis
- Risk of infection varies with:
  - -Type of procedure
  - -Complexity of the procedure
  - -Patient susceptibility
  - -Clinical setting: home care, ward, critical care unit, operating room
  - -Skill of health worker performing it
  - -Ethics: it would take a brave person to test effectiveness of asepsis in a trial

Challenges to RCTs: summary

- Obtaining homogeneous sample: need to compare like with like (no good comparing high risk procedure vs. low risk procedure) → huge sample to allow for variation → cost & time
- Poor control: hard to control health worker's skills, patient susceptibility
- Ethics: would an ethics committee sanction a trial where sterility might be withheld for a high risk patient?

Is there any evidence that clean technique is safe?

- Purssell et al 2023: systematic review and meta-analysis
- Only nine studies identified
- All looked at low-risk procedures only e.g. wounds already infected/contaminated
- NO evidence that clean technique is less safe than aseptic technique → included in updated guidelines from Wound, Ostomy and Continence Nurses' Society

Imperatives to find a solution: findings from a research program have identified problems

- Gould & Drey 2012: undergraduate nurses described variations in aseptic technique, often different to what they were taught → national survey in the UK
- PhD studentship at Cardiff University, UK: national survey of nurse education & case studies in standard & well-performing organization
- Gould et al 2018: survey of reported practice in two NHS organizations
- Hawker et al 2022: survey of nurse education
- Gould et al 2021: national survey of understanding of aseptic technique in UK→ contacted RCN
- Hawker et al 2022: literature review of international educational practice
- Hawker et al 2023: qualitative study (case studies)
- Gould et al 2023: qualitative study
- Purssell et al 2023: analysis of international guidelines for aseptic technique

Evidence of suboptimal practice in ward-based and home care settings

- Pre-registration nursing education in UK does not prepare students to undertake aseptic technique effectively (Hawker et al 2020, 2022, 2023)
- Continuing professional development to update aseptic technique is variable & inadequate in the UK (Gould et al 2018, Gould et al 2021)

Confusion about when & how to undertake aseptic technique (Hawker et al 2023)

Nurse educators said:

- 'So aseptic is sort of sterility.'
- 'The area, the patient has to be as clean as possible, as sterile as possible.'
- 'Asepsis to me is not clean and it's not sterile, it's in the middle.'

Some more examples

‘Non-touch … I would say minimal touch because sometimes you do have to touch but as long as … I’m not touching with my gloves if I’m touching with gauze ... Is that classed as non-touch? ‘

‘In home care settings you haven’t got steel trolleys ... you have to find the best surface you can that’s clean … I think it’s difficult … there could be some invention where you’ve got a better surface to perform it on … a collapsible trolley …’

Reports of unwarranted variations in practice (Gould et al 2021,2023)

‘Everyone does different things, and they disagree on what’s necessary for what. We do whatever the “cleanest” person wants to do at the time.’

‘The guidelines where I work suggest you implement the same technique for a chronic wound as for a central line. That’s not possible, especially in a community setting. Some common sense has to prevail. One rule doesn’t suit all settings.’

Powerful emotions (Gould et al 2023)

- Belief that standards have fallen since 1990s and withdraw of national pre-registration competency assessment

- Blaming others for poor standards e.g. nurse educators, clinicians, student nurses, medical staff (Attribution Theory)

'Lack of aseptic technique is punishable by death, and it won't be your death. It will be the patient's.'

'You can tell somebody to do something one day and the next day they do something else. You think – "I didn't tell you to do that!" They need constant reminding. The solution? I wish I knew. It's disheartening.'

Complexity of clinical practice (Gould et al 2023)

- Many contemporary nursing procedures are protracted & complex
- Conducted under less-than-ideal conditions (e.g. patient's home, community clinic) or ergonomically compromised conditions (e.g. corridor care, loss of dedicated treatment rooms)
- Much depends on what can be accomplished under difficult circumstances
- 'Elite' practitioners more optimistic and positive than 'mainstream' practitioners:

'The surroundings might not be clean but the sterile field is the sterile field, even if you have to set it up on the carpet.'

Conclusions from the research programme

- Confusion exists about the aim of aseptic technique
- Guidelines are needed to support safe practice
- Educational resources are needed to support undergraduate nursing education and continuing professional development

Solution (Haesler et al 2016)

- Apply principles from microbiology
- Present the principles to stakeholders (practitioners, educators, clinical managers) → obtain 'expert' opinion through consensus exercise

Principles of microbiology

- Asepsis: complete absence of micro-organisms
- Aim of aseptic technique: avoid transferring micro-organisms to vulnerable surfaces
- Applies to high-risk situations/patients very susceptible to infection
- The sterile-to-sterile rule applies:
  - Contact allowed only between surfaces that are sterile
  - Only sterile equipment & fluids can be used

Clean technique

- Cleanliness: physically removing visible contamination (e.g. dirt, debris, organic matter)
- Aim: reduce risk of transferring micro-organisms to vulnerable surfaces
- Used for years in some clinical settings (e.g. leg ulcer clinics)
- Applies to situations/patients not considered high risk
- Sterile to sterile rule does not apply

  -Sterile equipment & fluids need not be used

  -Contact allowed between vulnerable site and non-sterile items

  -Example: tap water can be used to clean a wound, non-sterile gloves could be used

Obtaining opinion: Delphi methods

- Recommended when there is no robust evidence, evidence is weak or inconsistent
- Participants rate agreement with statements about the topic drawn from existing information (in this case microbiological principles in different clinical situations)
- Controlled conditions: panellists' own ratings compared to rest of panel
- Carefully moderated event to avoid pressure


We are holding the Delphi event tomorrow in London!

Thank you

- Cardiff University for the PhD studentship
- Royal College of Nursing for coordinating the research program all this time
- All the people who have given their time to filling in questionnaires, being interviewed
- SC Johnson for financial suppor

References

Please see separate handout

www.webbertraining.com

JULY

10 ... Challenges to Maintaining Asepsis in Patient Care Settings Beyond the Operating Department
With Prof. Dinah Gould, UK

Af... Postponed ...Teleclass
22 ... Proposal for a Screening Protocol for *Candida auris* Colonization
With Juliette Severin, Netherlands

24 ... Empowering Nurses in Antimicrobial Stewardship (an IFIC teleclass)
Afro-European Teleclass
With Prof. Maria Clara Padoveze, Brazil, and Dr. Enrique Castro-Sánchez, UK

AUGUST

7 ... How Do Perceptions of Hygiene and Cleanliness Influence Infection Prevention Behaviours in Our Homes and Everyday Lives, and in Healthcare Settings?
With Dr. Sally Bloomfield, UK

12 ... Barriers to Implementing IPC Programs in Low Resource Settings and How to Overcome Them
With Prof. Shaheen Mehtar, South Africa

20 ... Insertion and Maintenance of Bundles for Peripheral IVs
Australasian Teleclass
With Dr Gillian Ray-Barruel, Australia

SEPTEMBER

18 ... Resource Sustainability and Challenges in the Supply Chain: Implications for Infection Prevention
With Prof. Ruth Carrico, US

23 ... Patience, Patients and Persistent Antimicrobial Resistance
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With Colm Dunne, UK

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