

Combating the myth that using surgical stretchers increases the risk of infection and consequent post-operative complications

The benefits of using an operating stretcher (efficiency of theatre time and reduced manual handling for staff and patients) are well documented, yet some practitioners continue to have concerns that the practice carries an inherently greater risk of infection (and consequent post-operative complications) because they deem it to involve the introduction of a non-sterile piece of equipment into the operating theatre.

This is illogical however, as it is based on the premise that the operating theatre is a sterile environment, which is actually not the case:



Current practice

While the operating table might be washed down and new drapes and instruments used, theatres do not generally get a 'deep clean' between cases – nor do personnel change all of their scrubs etc. And operations (particularly orthopaedics) inevitably create non-sterile material (blood etc,) not all of which may be seen and removed between cases.

Equally, the table itself does not get a deep clean – and there are hundreds of other items (machines / equipment) that have to be 'reprocessed' throughout a list, with the accompanying risk of potential cross infection.

The vital zone for sterility is, therefore, more accurately, a sterile 'bubble' around the operating site. This is achieved by disinfecting the wound area and creating a barrier between this and the rest of the environment with drapes and by using autoclaved instruments and sterile gloves. This not only stops infection from getting into the wound – but also stops unsterile matter getting out into the wider theatre environment.

Understanding this context, we therefore have to ask how using a surgical stretcher, with all its other benefits, carries greater risk than using a regular transport stretcher to deliver the patient to theatre and collect them after their procedure? Indeed, using the surgical stretcher also presents a further benefit, because it does not need to be cleaned inside theatre, where the imperative is not to delay the arrival of the next case. Instead, cleaning can be carried out thoroughly in the less pressured environment of recovery, after the patient has left.

Examining the causes of Surgical Site Infections (SSIs)

SSIs are caused by the microbial contamination of the surgical wound and can come from a number of sources, as detailed by medical solutions company **Mölnlycke**¹:

- **From the skin of patients**
- **From the surgeons and other operating room personnel**
- **From the air**
- **From contaminated surfaces or instruments used during surgery**

As they say, preventing SSIs is not easy: looking at the first two potential sources, it's estimated that about one-third of the population naturally carries the bacteria, *Staphylococcus aureus*, on the skin and in the nostrils². Some strains of this bacteria (e.g. methicillin-resistant *Staphylococcus aureus*, MRSA) are resistant to several antibiotics. Both staphylococci and enterococci bacteria can survive for days to months after drying on commonly used hospital fabrics and plastics.

Mölnlycke also details why air is also a source of infection: humans shed thousands of skin scales every minute, each potentially carrying bacteria (80% of bacteria comes from the air)³.

The fourth area of risk focuses on equipment: and surely this will be limited if only one item (a surgical stretcher/trolley) is being used for patient transport, treatment and recovery, rather than three (i.e. stretcher / operating table / stretcher)?

The fact of all these potential sources of infection suggests that a combination of measures and practices (use of gloves / single-use surgical clothing / drapes / laminar flow systems / cleansing of patient skin, to name but a few) will eliminate as much risk as possible.

The paper **'Prevention and Control of Infections in Hospitals'**⁴ by Bjørg Marit Andersen of Oslo University Hospital in Norway, with its special section Operation Department: Infection Control, offers many practical, preventative procedures to protect patients against SSIs.

It reflects that infection control in the operation department is the result of many single factors and routines, and is based on experience, documentation and expert panels through more than a hundred years. But many of these lack evidence, and will probably never be investigated because of ethical problems, and so consensus and guidance are the key elements.

As the paper explains: *'Surgery opens into sterile tissues for hours, where there is massive tissue damage by knife, diathermy, clogging of vessels, pressure against and drying of tissues, decreased blood supply, impaired phagocytosis and impaired infection defence. Microbes deposited in these devitalized tissues may find a good basis for growth and proliferation if there is lack of infection control and sterility. For patients with ongoing infections and who need surgery, special routines are made to prevent the spread of infections in the operation department.'*

The paper goes on to cover responsibilities for infection control, practical measures, personal infection control, factors like bacteria, ventilation, humidity and temperature and many other measures including protective clothing and the storage and disinfection of equipment used in theatre to eliminate as much risk as possible. For the full paper, [**CLICK HERE**](#)



Using a surgical stretcher: the benefits:

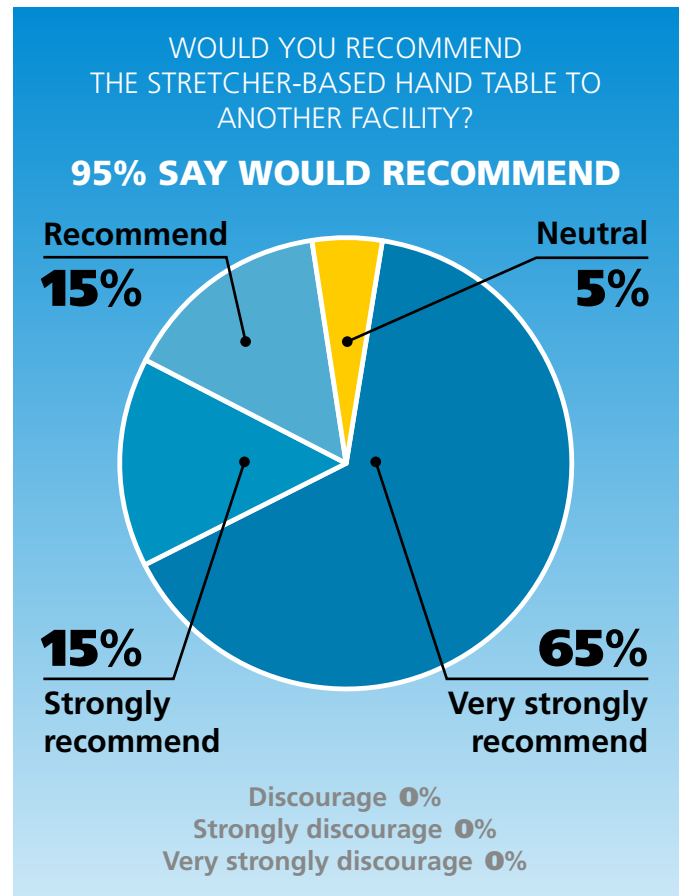
Once concerns about infection control have been addressed, perhaps it is valuable to focus more on the benefits of using a surgical stretcher:

EFFICIENCY OF THEATRE TIME

The paper, *'The Effect of Stretcher-Based Hand Tables on Operating Room Efficiency at an Outpatient Surgery Center'*⁵ was a very specific study designed to compare the use of surgical stretchers against a traditional operating table set-up by a team focusing on carpal tunnel and trigger finger releases.

It was a particularly valuable area to focus on, as hand surgery stands to benefit greatly from increased OR efficiency because of its pattern of high frequency, short cases requiring multiple OR cycles. The group measured the duration of procedures from the time the patient entered the OR to the time they left in 218 cases using a traditional operating table, and 217 using a surgical stretcher. Published in the Orthopaedic Journal at Harvard Medical School in 2017, the authors concluded that there was a time saving of four minutes per case when compared with traditional operating room tables.

- They then extrapolated the cost based on OR cost at their own institution at the time the study was carried out in 2014, and concluded there was a potential annual saving at that time of more than \$46,000 dollars per surgeon. Allowing for inflation, that could equate to as much as \$58,500 today. Not only that, they found the protocol made a favourable impression across the OR staff involved, with 72% preferring the stretcher-based hand table, 100% thinking it improved efficiency and 95% recommending the method to another facility.



COST SAVINGS

These findings build on the approach documented by a team from the Department of Orthopaedic Surgery at the Thomas Jefferson University Hospital in Philadelphia. Their specialism was hand and elbow procedures and in their letter to the editor of the Journal of Hand Surgery '**Operating on a Stretcher: A Cost Analysis**'⁶ they explained how an anaesthesiologist reassured them when they had expressed initial concerns about emergency intubation or cardiopulmonary resuscitation explaining that the stretcher they were going to use could accommodate these emergency procedures and had Trendelenburg positioning features.

They performed an institutional review board–approved, retrospective study to compare the time savings by operating on a stretcher compared with a standard operating room table. They evaluated 120 patients divided into four groups of 30, comparing operating on a stretcher versus a standard operating room table for patients with either local or general anaesthesia.

As with the Harvard Medical School study, they found significant time savings - an average of 7.5 minutes per case with either local or general anaesthesia, which they described as a '*statistically significant difference.*'

Not only did they conclude the technique saved time and money, but they also highlighted the additional safety benefits of reduced lifting and handling for staff. According to their letter: '*Assuming the average hand surgeon performs approximately eight cases a day, this equates to an hour savings per day, more than enough time and money savings to pay for the hand table in 1 day (estimated operating room cost per hour at \$2,000/h1). Because most postoperative patients are still drowsy and cannot move themselves, this technique allows a quicker exit from the operating room and eliminates the risk of staff injury from moving the patient. These injuries can lead to a substantial cost to hospitals and ambulatory centers. 2–4 Since beginning this technique, we have not encountered an instance where an operating room table would have been more advantageous for elbow, wrist, and hand surgery. With so many fixed operating room costs, this technique provides a simple method to save time and money.*'

CLICK HERE to read the full letter

PLANNING AND STAFF ENGAGEMENT

These arguments clearly resonate with an article published in 2008 by Dan Krupka and Peter Logue who look at some of the practical considerations which need to be taken into account when making the move to stretcher-based operating entitled: '**Making Stretcher Tables Work in Your Facility: Tips to maximize the impact stretcher tables have on OR performance**'⁷.

They say the key is to find out how much time you can save by comparing how a facility's processes will run both with and without stretcher tables – and this is their three point approach:

- **Figure out how many tables you need.** As a general rule, assign three stretcher tables to each OR. In the middle of a usual day, you'll have one patient in pre-op, another in the OR and a third in recovery. If your procedures take longer than the recovery time plus the pre-op time, you may be able to get away with two per room, provided you have an extra surface, such as a bed or a spare stretcher, in the recovery room. If your procedures are very brief, you'll need more than three tables per OR.
- **Pick someone to clean and prepare them.** You must clean and prepare stretcher tables after they've left the recovery room and before they're returned to the pre-op area. Designate a person and a place to perform this task.

- **Designate storage space.** At the start of each day, you should have one stretcher in pre-op, but none in the OR, so you'll need to figure out where to park the rest of the stretchers overnight. Also, assign someone to move the tables from the storage spot to the pre-op area as the day progresses.

They then suggest looking for even more opportunities to save time:

'Consider having the tasks performed during non-operative times done in parallel, which may mean reallocating some responsibilities and abandoning some old processes. For example, if the circulating nurse usually gets the patient from the pre-op, think about having a member of the anaesthesia team do this instead. Or if the circulator usually accompanies the anaesthesiologist to the recovery area, have them stay in the OR to help set up for the next case.'

The next stage is to examine available stretchers to see which have the features and capabilities surgeons need – while also looking at respective model prices.

Last, but by no means least, they stress the importance of effectively communicating and involving staff to ensure they embrace the change of approach. This is their staff engagement 'checklist:'

- ✓ **Involve everyone – the physicians, nurses, administrative staff and ancillary staff – when making the purchase decision.**
- ✓ **Have them help design a new end-to-end patient flow. This must include mapping how the old process ran, how the new one will run and a definition of individual rules for participants.**
- ✓ **Perform end-to-end dry runs. Put a staffer on the table in pre-op to test for comfort and what it's like to move this "patient" on the table. Make sure that all the staffers are familiar with their (possibly) modified roles. Check how long it takes to clean and prepare the table for the next patient, and make sure your plans for storing the tables and accessories are feasible.**
- ✓ **Appoint someone with clout to own the process and to take the lead in making any changes that may be necessary.**
- ✓ **Decide how you'll measure performance. This includes putting more emphasis on non-operating time instead of turnover time as a whole (see sidebar).**
- ✓ **Let everyone know how the system's working. That lets them know that their efforts have paid off and encourages them to continuously improve performance.**

To read the full article [CLICK HERE](#)

Conclusion

Overall, the number of individuals and organisations choosing the surgical stretcher approach is growing because of multiple benefits – and the effective management of infection control is one of those benefits, not a risk.

References

1. Infections in the operating room, [Mölnlycke](#)
2. Public Health England (PHE). MRSA information for patients. London: PHE; 2010.
3. Howarth FH. Prevention of airborne infection during surgery. *Lancet*. 1985;1(8425):386-388
4. '[Prevention and Control of Infections in Hospitals](#)' by Bjørg Marit Andersen Oslo University Hospital, Norway
5. [The Effect of Stretcher-Based Hand Tables on Operating Room Efficiency at an Outpatient Surgery Center](#), THE ORTHOPAEDIC JOURNAL AT HARVARD MEDICAL SCHOOL, Gonzalez et al., Volume 18 June 2017
6. JHS _Vol 36A, December 2011 [Journal of Hand Surgery](#)
7. [Making Stretcher Tables Work in Your Facility: Tips to maximize the impact stretcher tables have on OR performance'](#)