The Mattress Sale. One for every back.

NOW ENTERING
WHY
POPULATION . 527,819

WHY NOT GP
Risk factors

Diabetes


95% of the nondiabetics obtained excellent or good results

39% of the diabetics obtained excellent or good results

Diabetic

- 24% incidence of superficial wound infection
- 10% incidence of deep infection

Non diabetic

- no infections

Diabetes decreases leukocyte adherence, chemotaxis, and phagocytosis

Physicians maintain phagocytic activity and bacterial killing by lowering blood glucose levels to normal

Their relative poor blood supply secondary to their vascular disease

- lengthens healing by decreasing the supply of critical factors for cellular function such as oxygen
- Poor blood supply also decreases the penetration of antibiotics to their target areas
Risk factors

**Obesity**


14% of infections were in patients defined as obese

**Causes**

Increased exposure

Reduced vascularity of adipose tissue relative to muscle

Fat necrosis can occur with the use of self-retaining retractors and electrocautery
Malnourishment


<3.5 g/dL for serum albumin, <1500 for total lymphocyte count considered thresholds for malnourishment

Preoperative nutritional status was a strong predictor of postoperative complications

114 patients undergoing lumbar decompression and fusion were analyzed with respect to serum albumin and total lymphocyte count

Of the 13 postoperative infections, 11 were found to be malnourished

Malnourishment leads to a depressed immune system and increased risk of infection
Smoking
Smoking increases the risk of infection
Nonsmokers had significantly fewer infections than current or former smokers

Clean sacral skin wounds were infected less in nonsmokers
Patients who had recently quit as well as those on a nicotine patch had fewer infections than smokers and were similar to nonsmokers
Even short periods of abstinence from smoking can decrease infection risk
Risk factors

Smoking


On the cellular level, it has been shown that smoking decreases the subcutaneous wound oxygen level


Smoking decreases fusion rate compared to nonsmokers

The nonunion rate in nonsmokers was 14% compared to 26% in patients who continued to smoke after surgery

Patients who had quit smoking for a six-month period achieved a similar fusion rate of 17% to the nonsmokers
Risk factors

**Trauma**

Compared to elective surgical cases during the same period, emergent traumatic cases had a significantly higher infection rate, 9.4% versus 3.7%.

Paralyzed patients also are at higher risk of infection than incomplete or normal neurological

**Preoperative hospitalization**


Patients admitted >1 week prior to surgery had an 6% infection rate compared to patients hospitalized <1 week with a 2.8% rate
Pearls

Preoperative visit
Don’t just update the consent

*Taking a detailed history and performing an examination prior to surgery*

Is important to determine if patients have remote infections
Predictors of disaster

Smoking
Obesity
Diabetes
Traumas
Malnourishment
Preoperative radiation
Complications

Death
Paralysis
Wound dehiscence
CSF leak
Infection
Wound dehiscence

Muscle and musculocutaneous flap coverage of exposed spinal fusion devices


The use of muscle and musculocutaneous flaps provides
Excellent soft-tissue coverage
Obliterates the dead space
Controls the infection
Creates conditions to salvage the hardware
Wound Dehiscence


Retrospective study

22 patients treated for postoperative soft tissue defects of the spine

Group 1 (n = 15) had postoperative wound infections or dehiscences

Group 2 (n = 7) had "prophylactic" flaps at the time of their initial spine surgery

The indications for "prophylactic" closure included multiple prior surgeries, prior infection, and previous radiation therapy

Group 1 was treated with drainage, dressing changes, and one-stage flap closure of their wounds

Group 2 was treated with a variety of closure techniques at the time of their initial surgery
Muscle flap, salvage of spine wounds with soft tissue defects or infection

RESULTS:

Despite the large defect size, 19 of 20 surviving patients currently have healed wounds, and all the patients have maintained their instrumentation.

Two patients died of causes unrelated to their wound problems.

CONCLUSIONS: Flaps are a useful adjunct in the treatment of patients with complex spine wounds.

Sliding paraspinal muscle flaps can effectively close wounds from the high cervical to the low lumbar area in one operative procedure.
Rotational and transpositional flaps for the treatment of spinal wound dehiscence and infections in patient populations with degenerative and oncological disease


- Retrospective study
- 37 Pt
- Total of 1.3 procedures for the treatment of wound healing problems
- Cultures were positive in 70%
- In 3 patients this treatment failed due to protrusion of hardware through the skin or repeated dehiscence requiring reclosure
Rotational and transpositional flaps for the treatment of spinal wound dehiscence and infections in patient populations with degenerative and oncological disease

CONCLUSIONS

Spinal instrumentation was salvaged in 97% of the cases

Highly vascularized tissue is used
- Increase healing
- Accelerate clearance of bacteria
- Fill any dead space
Prolonged Jackson-Pratt drainage in the management of lumbar cerebrospinal fluid leaks

Hughes SA, Ozgur BM, German M, Taylor WR. Division of Neurosurgery, San Diego Medical Center, University of California-San Diego, CA 92103-8893, USA.

184 charts reviewed, 3-year period

There were 16 cases in which a dural tear and repair were carried out and subsequently treated with subfascial (JP) drainage

8 with prolonged JP subfascial drain discharged home on oral antibiotics. JP drains were removed in clinic 10 to 17 days post op.
RESULTS:
All patients were discharged in the same time frame.
No patients suffered complications arising from prolonged drain presence.
No patients suffered from persistent CSF leak after drains were removed.

CONCLUSION:
Routine intraoperative subfascial JP drain placement aids in the early diagnosis of postoperative lumbar CSF leak.
Primary closure of dural tear remains the standard of care.
In select cases, prolonged JP drainage in the setting of postoperative CSF leak may be a useful technique for the treatment of these leaks.
### Predictive factors for dural tear and cerebrospinal fluid leakage in patients undergoing lumbar surgery


In 12 of 76 patients with dural tears CSF leakage developed

In the 12 patients with dural tears, (75%) were caused by a resident-in-training, and the Kerrison punch was the instrument most often being used at the time (55%)

In all cases fibrin glue and a muscle/fat graft were used to cover the tear

**CONCLUSIONS:**

Older patient age and higher level of the surgeon's training were factors contributing to the incidence of dural tears
Horwitz NH, Curtin JA. Prophylactic antibiotics and wound infections following laminectomy for lumbar disc herniation. *J Neurosurg*. 1975; 42: 727-731

Reduction from 9.3% to 1% in infections in patients undergoing lumbar diskectomy

1 g of cefazolin within 1 hour of incision for simple diskectomy

The antibiotic dosage is continued every 8 hours for 24 hours postoperatively for decompressions and sustained for 48 hours when an arthrodesis is performed.
Another standard procedure for preventing infection is irrigation during the surgical procedure to “wash out” possible contamination.

Dr. D. Peterson

Dilution is the solution of pollution.
Wound infection prevention


The air circulation system of the operating room also affects potential infection rates.

Fewer airborne bacteria were found present around the surgical site in a laminar flow ventilation room compared to conventional ventilation.
Wound infection


The complexity of the surgical procedure is a large determinant of infection

With rates of ~1% for simple discectomy, ~2% for uninstrumented fusions, and ~6% with instrumented fusion


Significantly higher infection rate for patients with extended preoperative hospitalization >1 week, blood loss >1000 cc, and in patients with operating times >3 hours
## Wound infection

### Treatment

| Removal of the offending agents with debridement and treatment with antibiotics |
| Infection in an instrumented fusion is a difficult scenario |
| Early recognition and preservation of adherent bone graft and retention of the hardware during debridement is very important |
Wound infection
Treatment


The pseudarthrosis rate in the face of infection is higher. Overall the fusion rate was 62% when infection complicates the surgery. If fusion to the sacrum was not attempted the fusion rate was 87%. The use of allograft resulted in a 17% fusion rate versus autograft, 83%.
Conservative medical therapy of infections following osteosynthesis: a retrospective analysis of a six-year experience

Pavoni GL, Falcone M, Baiocchi P, Tarasi A, Cassone M, Serra P, Venditti M. Department of Clinical Medicine, University of Rome La Sapienza, Italy. g.pavoni@libero.it

Conservative medical and antimicrobial therapy without removal of the osteosynthesis until adequate bone callus deposition is documented by bone radiography scan

20 Pt with infections associated with intramedullary nailing (9 patients), screws and plate (9 patients) or screws (2 patients) were treated between 1995 to 2000
Conservative medical therapy of infections following osteosynthesis: a retrospective analysis of a six-year experience

Diagnosis of infection was based on clinical-microbiological evidence and confirmed by 99Tc-labeled leukocyte scan studies.

Offending pathogens were Staphylococcus aureus 17 cases, Staphylococcus aureus + Escherichia coli, Staphylococcus epidermidis, unknown, 1 case each.

Mean duration of antimicrobial therapy was 27.7 weeks (range 12-64 weeks). All patients (100%) were cured, and none complained of side-effects requiring antibiotic therapy discontinuation.

We conclude that conservative medical therapy is feasible for osteosynthesis-associated bone infection.
Wound care after posterior spinal surgery. Does early bathing affect the rate of wound complications? Carragee EJ, Vittum DW. Stanford University, School of Medicine, California, USA.

Traditional teaching usually calls for the wound to be kept clean and dry for 10-14 days or until shortly after the sutures are removed.

Studies have shown wound closure with skin staples to be resistant to external contamination.

METHODS: One hundred consecutive patients undergoing posterior spinal surgery with skin closure using steel skin staples were prospectively allowed to shower and wet the surgical wound 2-5 days after surgery.
Wound care after posterior spinal surgery. Does early bathing affect the rate of wound complications?

These results were compared with a historic control of 100 consecutive patients done in the previous year.

RESULTS:
There was one deep infection in the control group and none in the experimental group.
There were three superficial wound problems in the control group, and two in the early bathing group.
All superficial wound troubles healed without sequelae.

CONCLUSIONS:
Prohibition of showering of patients after uncomplicated posterior spinal surgery and wound closure with skin staples may be unnecessary beyond the first few days.
Wound Infection Treatment Pearls

Lehana Thabane
Absence of evidence is not evidence of absence
The Osteotomes

McMaster University

Orthopaedics