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ORTHOPAEDIC SURGEON

# Unicompartmental gonarthrosis →

‘numbers can help’

Juan de Fuca Meeting  
Victoria, BC  
May 15, 2010

# Outline

- Introduction of decision analysis tool
- Application of decision analysis tool:
  - to assess relative merit of current technology → UKA vs TKA
  - to assess potential risks/benefits of new technology

# Introduction

Evidence based surgical decision making:

- Multiple variables and parameters
- Ranges of reported outcomes
- Various sources of evidence



Individual surgeon belief system

- Belief system continuously updated and modified
- Multiple permutations: intuitive assessment difficult

# Methods

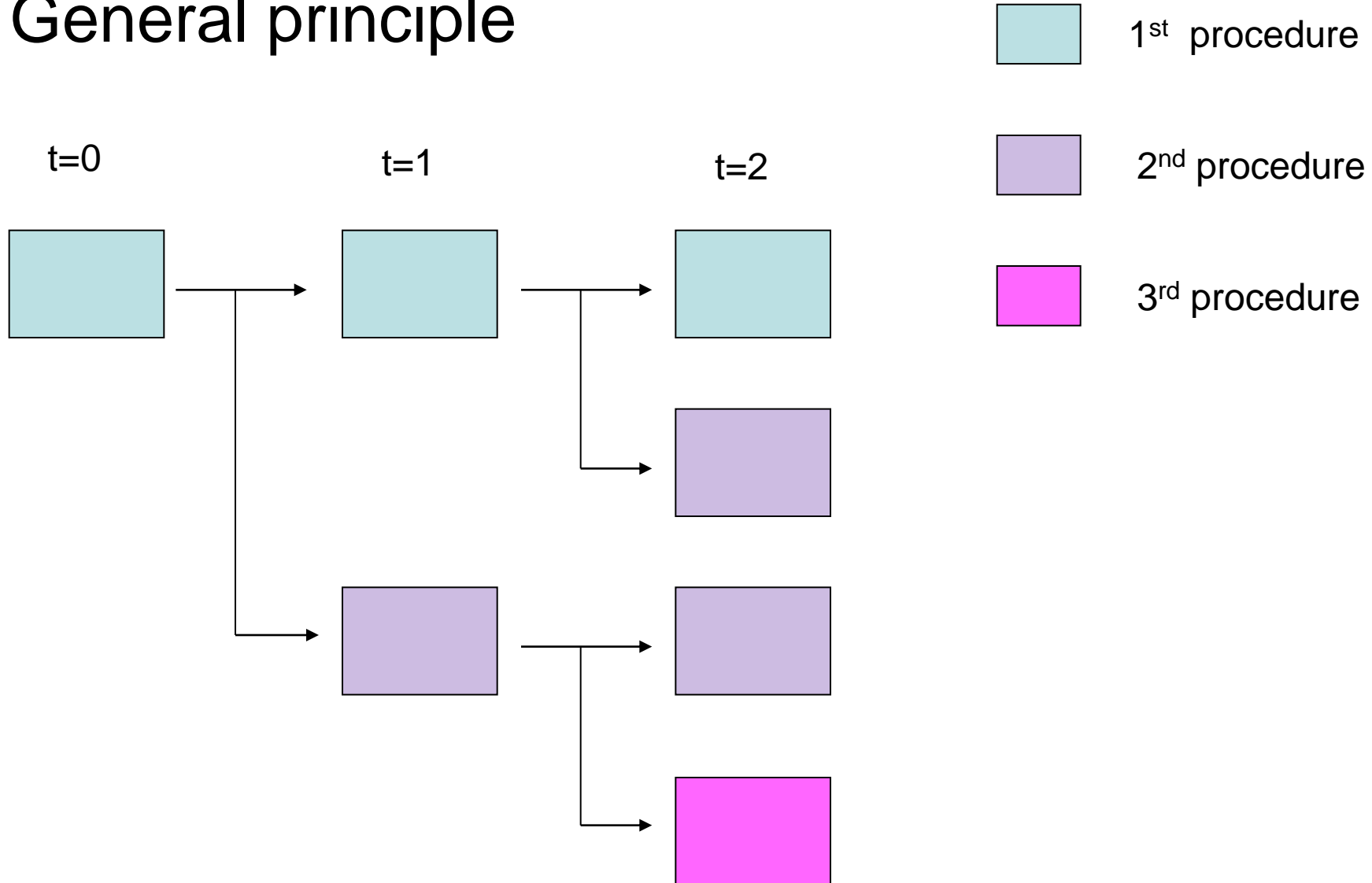
- Cohort decision analysis
  - assume 100 patients
  - age 60 y
  - end-stage anteromedial gonarthrosis
  - define initial and subsequent procedures
  - quantify procedure related parameters
  - assume linear procedure attrition rate
  - assume mortality of 2.5 % per year

# Methods

- each revision creates a new sub-cohort
- each sub-cohort has a linear attrition rate
- tabulate various procedures:
  - determine total cohort morbidity
  - determine cohort resource utilization

# Methods

- General principle



# •Methods

- Current model:
  - intervals user defined
  - user defined cap on revision number  
→ 'salvage'
  - allows more flexibility
- Initial modelling suggested:  
70 % 10 y implant survival of UKA would yield similar hospital utilization and infection rate as TKR

# Methods

- Group of 8 orthopaedic surgeons
- Decision analysis model discussed
- Consensus:
  - linear attrition rate was realistic.
  - revision of UKR -> TKA is similar to primary TKA.
  - 2nd and higher total knee revisions could be lumped together.
  - outcomes & resource utilization defined



# Results: surgeons' consensus

	<i>10 y attrition(%)</i>	<i>cost(\$)</i>	<i>hosp (days)</i>	<i>infection</i>
• <i>UKR</i>	10%	\$11,000	1	0.5%
• <i>TKR</i>	5%	\$13,400	3	1%
• <i>U -&gt;TKR</i>	5%	\$13,400	3	1%
• <i>TKA R1</i>	15%	\$17,500	4	3%
• <i>TKA R&gt;1</i>	25%	\$20,000	7	5%

# Results: cohort decision analysis

	<i>Primary procedure UKA</i>	<i>Primary procedure TKA</i>
<i>Procedures</i>	115	108
<i>Cost, excl infections</i>	\$ 1,299,558	\$ 1,492,763
<i>Hospital days</i>	145	336
<i>Infections</i>	0.66	1.27

# Discussion

UKR is a valid option for treatment of medial compartment gonarthrosis, as assessed by this group of BC surgeons, based on consideration of reduced cost, hospitalization and total infection burden, despite a higher re-operation rate.

# UKA vs TKA:

- Decision analysis/ cohort modelling allows assessment of implications of surgeon's perception of relevant outcome parameters
- Results of cohort modelling after consensus seeking confirm that UKA as primary treatment for medial OA of the knee can reduce cost, cohort infection and hospital utilization, despite a higher number of total procedures.

# Additional considerations:

- Unloading bracing:  
assuming 20% per year attrition rate,  
uncomplicated conversion to UKA  
→ favourable
- HTO:  
'for another day'

# Assessment of new treatment options

- Clinical outcome not known
- Range of possible outcomes can be assessed
- May help establish preliminary balance between risks and benefits
- May help anticipate resource utilization

# Example:

## Metallic interpositional arthroplasty

Historical background:

- MacIntosh, McKeever
- Sbarbaro, Swanson
- used initially in OA and RA
- as far back as late 1950's
- required some bone preparation

# Metallic interpositional arthroplasty

- Unispacer (Sulzer, Zimmer)
  - brief period of interest in early 2000's
  - quick, relatively wide acceptance by US surgeons
  - scarcely reported on
  - issues: implant instability, overstuffing (?), arthrofibrosis
  - relied on femoral congruency for stability
  - 1 year revision rates ? 20-30% ?



# Unispacer



# Metallic interpositional arthroplasty

Contemporary use:

- Dr. R. Scott, Boston
- 'may be considered as a bridging measure in the treatment of unicompartmental OA'
- 70-86% implant survival at 8 y → not unlike HTO
- 10 out of 24 doing well at 16 years
- McKeever

# Metallic arthroplasty -Orthoglide

- Development history
  - 2003 – trial of a polyurethane interpositional arthroplasty (Advanced BioSurfaces)
  - Minimally invasive procedure
  - Stable implant
  - Initial recovery OK
  - Synovitis due to wear after 2-3 months
  - Trial stopped

# Metallic arthroplasty -Orthoglide

- Development history:
  - Evaluation of lessons learned
  - Metallic implants made of same configuration
  - 3 and 4 mm implants, various AP sizes
  - early experience reported in 2007 (300 implants, 92 patients with functional scores, mainly USA, Arnold)
  - 10% revision rate at 1 y, functional scores acceptable, WOMAC 32 → 72 at 6m, 1/300 dislocation, 1/300 infection.
  - To date: approximately 500 implants placed

# Orthoglide - medial



# Metallic arthroplasty -Orthoglide

- Considerations for community orthoped:
  - Is it safe?
  - Is it effective?
  - What about long-term management?
  - Is it acceptable to the health care system?
  - Cost and other resource utilization?
  - Health Canada licencing status?

# Metallic arthroplasty -Orthoglide

- Medial implant licenced by HPB, lateral implant licenced in US and Europe, Special Access in Canada.
- Safety:
  - potentially minimally invasive surgery
  - potentially minimal hospital stay
  - No violation of subchondral bone → potentially 'reversible' (management of infection etc)

# Metallic arthroplasty -Orthoglide

- Assume following range of parameters for medial Orthoglide:
  - Revision rate 5% or 10% per year
  - Revision
    - to UKA, no compromise
    - to primary TKA, no compromise
  - Daycare surgery under local anesthesia with IV sedation
  - Infection rate 0.5% (same as UKA) or 0.25%
  - Treatment of infection: removal of implant with IV antibiotics.



# Metallic arthroplasty -Orthoglide

- Current working assumptions
  - Infection rate  $\frac{1}{2}$  of UKA  $\rightarrow$  0.25%
  - Revision rate 5% per year
  - Revision to UKA (for majority)
  - Function at 1 y similar to UKA / TKA

# Orthoglide: outcome analysis over 20 years

*(5% / year revision, mortality 2.5% / year, revision to UKA)*

	OG	UKA
• Total procedures	176	115
• Hospital days	93	145
• Infection rate	0.67	0.66

# Orthoglide - medial



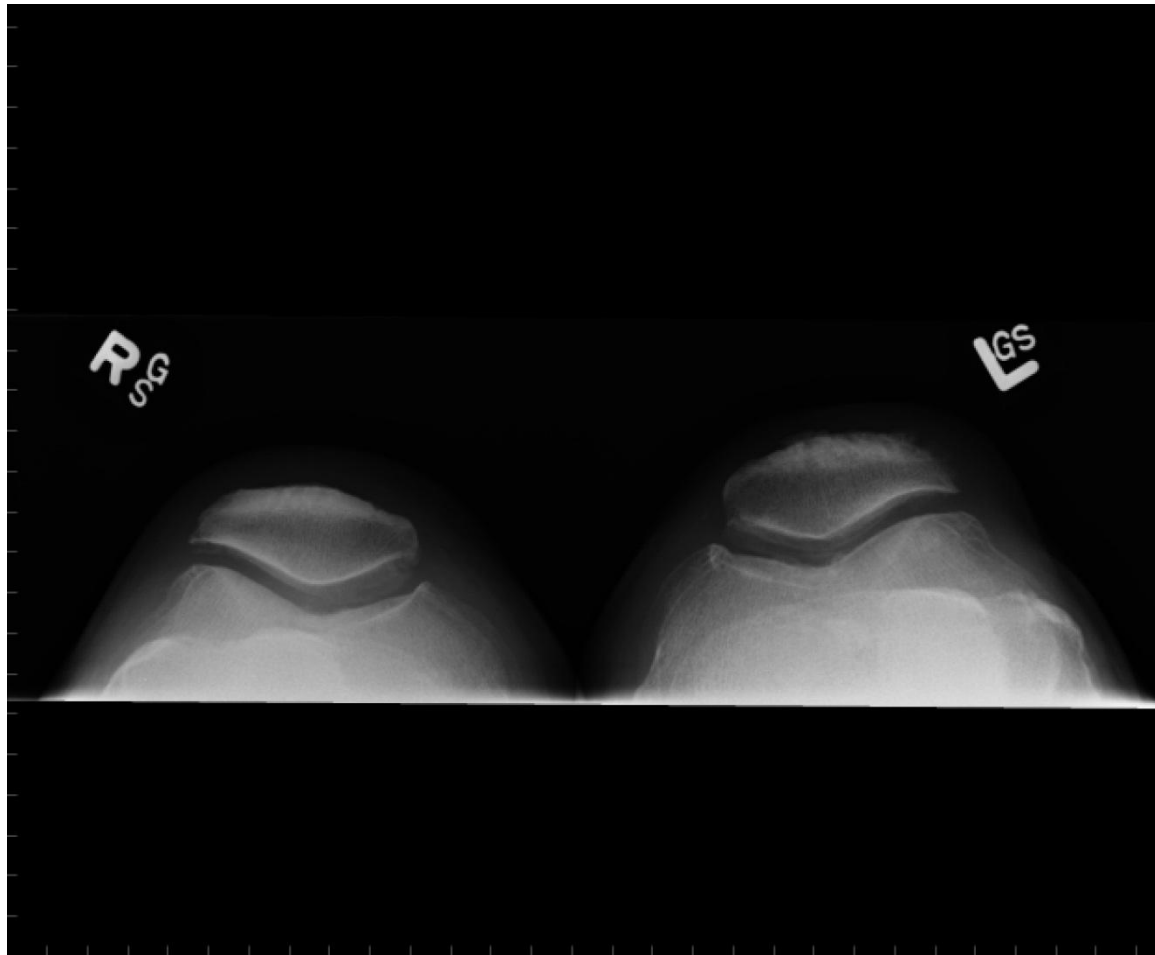
62 y old male, framer



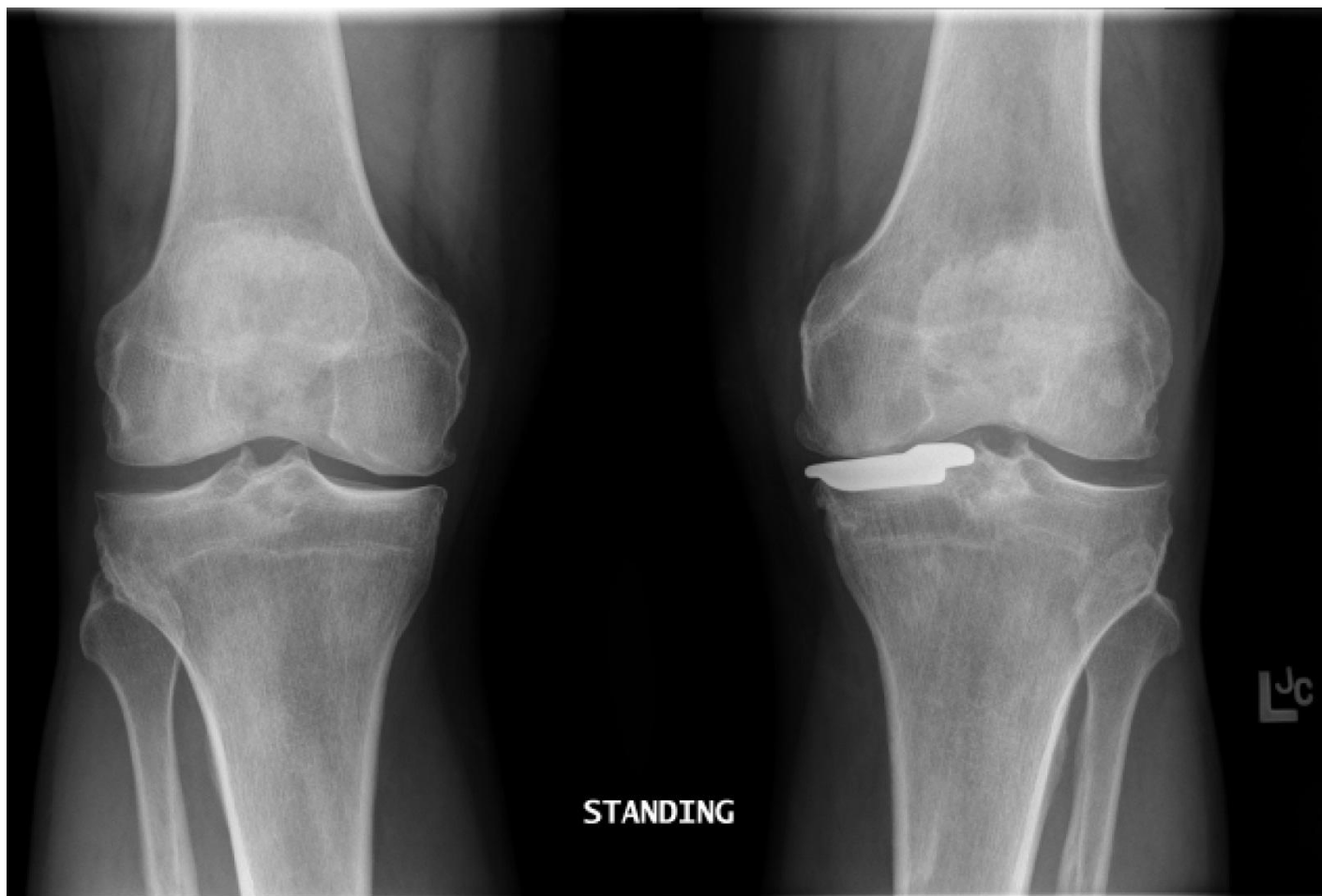
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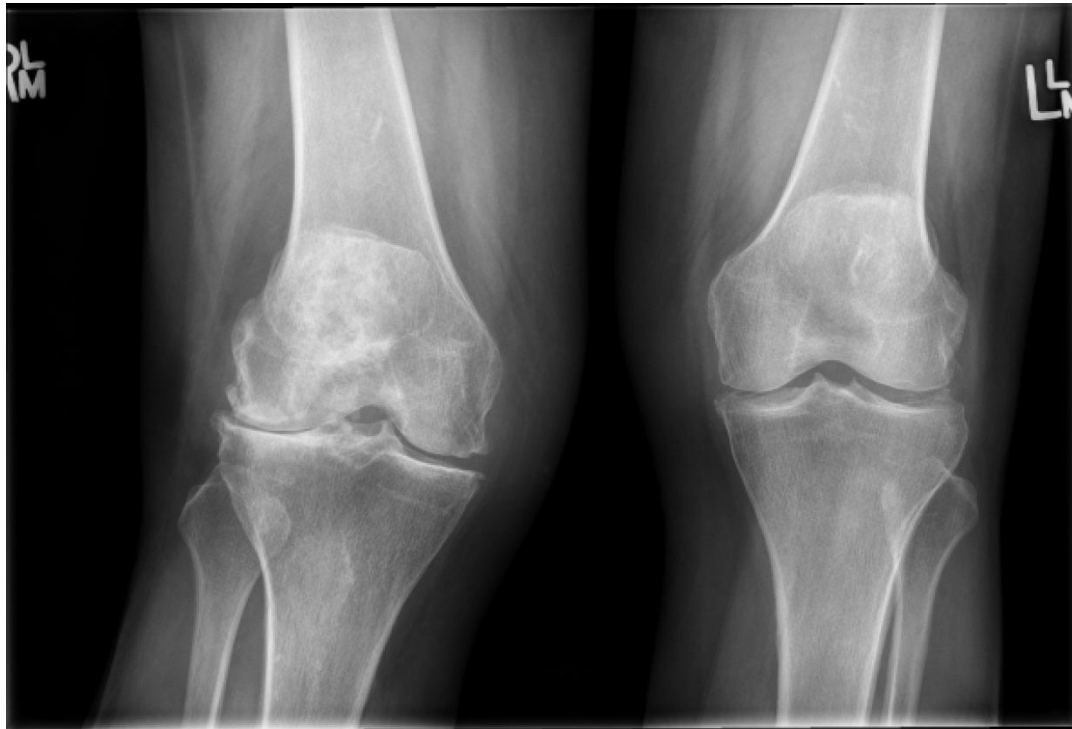




# What if expected lifespan is short?

- 82 y old female with lateral OA / RA
- Evaluated for TKA
- CXR → lung carcinoma
- Experimental chemo
- Immuno compromised
- Frail
- Pain +++, depressed +++

# Lateral Orthoglide: 82 y old female with lateral OA / RA



# 82 y old female with lateral OA / RA



# 82 y old female with lateral OA / RA

## PARR



# 82 y old female with lateral OA / RA 10 w postop



# Metallic arthroplasty -Orthoglide

- Current practice:
  - 'ideal' candidate for UKA → usually Oxford
  - 'too early' or 'not well enough' for TKA, but 'not ideal' for Oxford → consider Orthoglide
  - If strong patient preference → take into consideration (tolerance for uncertainty of effectiveness of implant, exposure to surgical risk vary widely).
  - **INFORMED CONSENT** of high quality

# Metallic arthroplasty -Orthoglide

- Early results:
  - Gradual introduction as of July 2009
  - Total as of May 1, 2010:
    - n=20 medial
    - n=3 lateral
  - Arthroscopically assisted, local anesthesia with IV sedation, day care surgery
  - One hematoma, washed out, good so far

# Metallic arthroplasty -Orthoglide

- Initial assessment
  - medial Orthoglide arthroplasty appears safe and can be effective
  - uncertainty persists re. consistency and extent of functional improvement
  - revision options are preserved
  - this may be a surgical tool to reduce overall patient risk when managing unicompartamental OA



# Conclusion

- Decision analysis / cohort analysis can assist in surgical decision making
- This type of approach may help when assessing
  - the relative merits of established technology
  - the potential value of new technology

**THANK YOU**