



wound closure device.  
includig: too much stress along a  
wound's edges from poor wound  
healing wound. Wound dehiscence is  
caused by a number of factors  
closure, infection,  
injury, and pre-  
closure, infection,  
wounds caused by a number of factors  
healing wound. Wound dehiscence is  
reopening of a  
dehiscence or  
wound  
encountered is  
complication  
A severe surgical  
complication  
postoperative complication?



What is the most common  
postoperative complication?



Over 45 million  
surgical procedures  
are performed each  
year in the United  
States. Each  
surgeon laceration  
benefited from wound  
closure will  
benefit from the  
care monitoring by the MWMD.

Who needs MWMD?

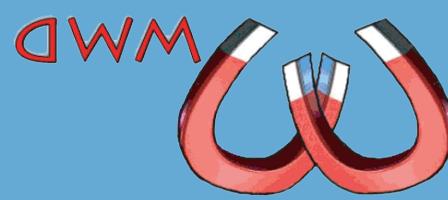
## MAGNETOSTRUCTIVE WOUND MONITORING DEVICE



L to R: Sean Lynch, Vanessa Yip,  
The Wound Monitoring Group  
Christopher Lacey, Sochetera Kong



Is brought to you by:



\$3500 per wound dehiscence.  
saving hospitals and physicians at least  
reduces the risk of wound dehiscence,  
permature removal. This ultimately  
reduces the risk of the  
closure through  
wound progress of a  
the healing  
process of a  
MWMD monitors



What are the benefits of  
using MWMD?

medical costs and lost time.  
thousands of dollars lost due to  
amount of healing time, resulting in  
dehiscence. Patients require a greater  
patients who develop wound  
death. Mortality occurs in 14% of  
lead to  
and can  
infection,  
carries a  
dehiscence  
Wound  
dehiscence  
high risk of  
causes  
dehiscence  
leads to  
lost time.



What complications could  
wound dehiscence cause?

The use of  
MWMD reduces the  
risk of wound dehiscence  
and hospitals thousands of  
dollars of time and  
saving doctors, patients,  
and medical costs.



## Engineering Design Specifications

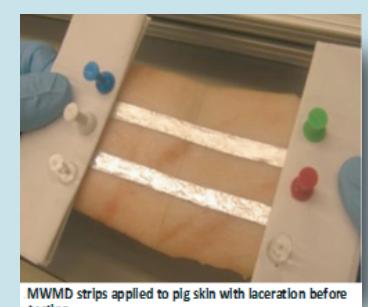
Size: 8.5cm by 1cm  
Max Weight: 20g

EDS Metrics	Max Points	Total Pt
<b>Expected Functional Parameter: Measures Tensile Stress</b>		
Measure Tensile Stress Across Support Layer	8	
Analyze & Record Tensile Stress for up to 1 Month	7	
Can be Calibrated to Literature Tensile Testing Values	5	
Repeatable and Reproducible Measurements	6	26
<b>Ergonomics:</b>		
Comfortable to wear device for 1 month	8	
Device does not slip along wound's edges	5	13
<b>Size:</b>		
Minimally Invasive, miniature integrated circuitry	6	
Support Layer Size	3	
Applicable to all Superficial Non-Joint Areas of Body	3	12
<b>Material Properties:</b>		
Robust, High Modulus of Elasticity & Ductile Fracture	4	
Minimal Special/Expensive Processing Techniques	3	
Biocompatible: No Toxic Degradation Products	6	13
<b>Compatibility with Past Products / Manufacturability :</b>		
Compatible with Adhesive FDA Approved Covering	3	
Compatible with FDA Approved Support Layer Material	3	
<b>Education:</b>		
Requires Minimal Attention Span	4	
Ease of Use: Requires Little Medical Training	1	5
<b>Ethics:</b>		
IRB Approval for Clinical Studies	9	
<b>Standards:</b>		
FDA's toxicology and biocompatibility protocols (G95-1)	9	
Fits ASTM Standards of Testing	7	16
	Total:	100

## Performance Testing



A 10cm x 15 cm piece of pig skin was cut with a scalpel to form a 4cm laceration. The laceration was closed using MWMD strips.



The pig skin was strained at a constant stress, and varying strain rates by a stepper motor, emulating wound dehiscence.



Pig skin clamped to stepper motor machine with MWMD strips attached with initial settings (no tension or compression). EMF sensor used to detect changes in EMF.

Changes in EMF were recorded by the Lutron EMF- 822 A meter.

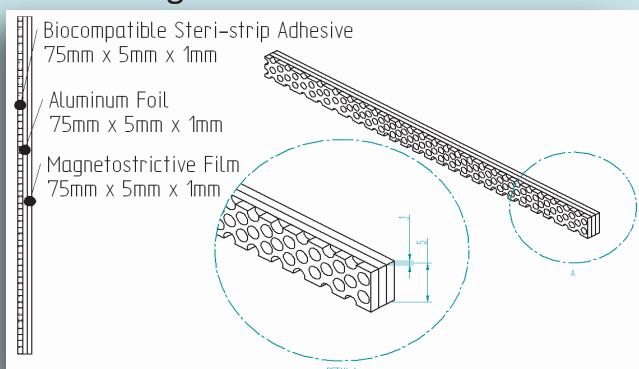
## Biocompatibility Testing

MWMD is biocompatible. A LDH cytotoxicity assay comparing the absorbance of samples cultured with and without pieces of MWMD strip was performed. A paired t-test found no significant difference between these two groups (p-value= 0.44, alpha= 0.05, beta=0.8)

## What is the MWMD made of?

The MWMD consists of three layers:

1. Wound support layer: 3M Steri-Strip.
  2. Tensile Stress sensing layer: Fe-based magnetostrictive alloy (Metglass 260552A)
  3. Counter layer: Aluminum foil
- This can be seen below in SolidEdge rendering of the MWMD.



## How does MWMD work?

During wound healing, each layer undergoes strain and bending, inducing a magnetic permeability change in the alloy. Physician can use WS FGM-3D2TN EMF meter to detect the change and can access the healing state using data relating EMF to tensile stress, similar to the graph above.

