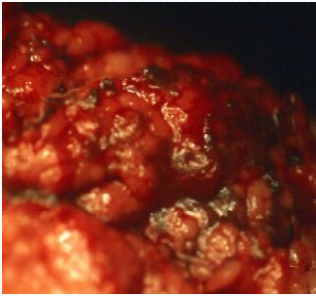


# Adhesion Prevention with Hyacorp endo gel



## Formation of Adhesions



**Bleeding  
Inflammation**

**Injury**



**Fibrin  
deposition**



**Adhesions**

### Steps to reduce adhesions during surgery

- Increase vascular permeability
- Reduce infection risk
- Minimize tissue handling
- Careful technique
- Microsurgery
- Reduce drying of tissues
- Lubrication
- Limit use of cautery
- Limit use of sutures
- Avoid materials with fibers
- Use starch-free gloves



# Applying adjuvants: solutions / drugs

- NSAIDs

- Most widely studied; clinical efficacy is questionable

## Corticosteroids

- Poor efficacy; associated with immuno-suppression and delayed wound healing

## Fibrinolytics

- Risk of impaired wound healing and/or bleeding

## Adhesion Reduction Agents: The ideal agent

According to recent surveys of surgeons the **four key** attributes are:

- Safety
- Efficacy
- Operation site
- Throughout the cavity
- Easy to use
  - General surgery
  - Gynaecological surgery
  - Open
  - Laparoscopic
- Economical

## Adhesion Reduction Agents Vs HyaCorp endo Gel

- Site Specific

- **Preclude\*** expanded polytetrafluoroethylene Gore-Tex sheet **Generally unavailable**
- **Interceed** oxidised regenerated cellulose fabric
- **Seprafilm** hyaluronic acid carboxymethylcellulose film
- **SprayGel/Shield** polyethylene glycol hydrogel
- 
- **SurgiWrap** copolymer Poly(L-lactide-co-D, L-lactide) sheet
- **Intercoat** Polyethylen oxide (PEO) /sodium carboxymethyl cellulose (CMC), 30 days to clear the Peritoneal Cavity.
- 

- Broad Coverage

- **Crystalloids** Ringer's lactate/saline +/- Heparin
- **Hyskon** 32% dextran 70 solution **Generally unavailable**
- **Sepracat** 0.04% hyaluronic acid-phosphate-buffered saline **Withdrawn**
- **Intergel** 0.5% ferric hyaluronate gel **Withdrawn**
- **Adept** icodextrin 4% solution

## Most Widely Used Adhesion Prevention Adjuvants

- **Crystalloid instillates**

- Lactated Ringer's
- Saline
- Hartmann's Solution

- **Limitations:**

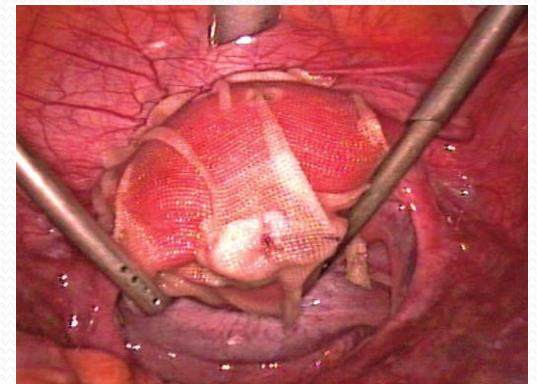
- Absorbed within 24 hours

**They don't prevent adhesions!**

# Intercede Barrier

(Oxidized Cellulose, Gynecare)

- First FDA approved adhesion reduction adjuvant
- Widely applicable
- all intra-peritoneal locations
- Compatible with laparotomy
- Limited use in colorectal surgery
- Limitations:
  - Blood oozing renders it ineffective
  - Irrigant's must be removed
  - Technical application challenges!



## Seprafilm Membrane

(HA+CMC, Genzyme)

- Widely applicable
  - covers all intraperitoneal locations
  - all surgical procedures
  - Used in general surgery
- Limitations:
  - Handling
  - Residual irrigation fluid must be removed
  - Cannot be used via laparoscopy
  - Cost!!

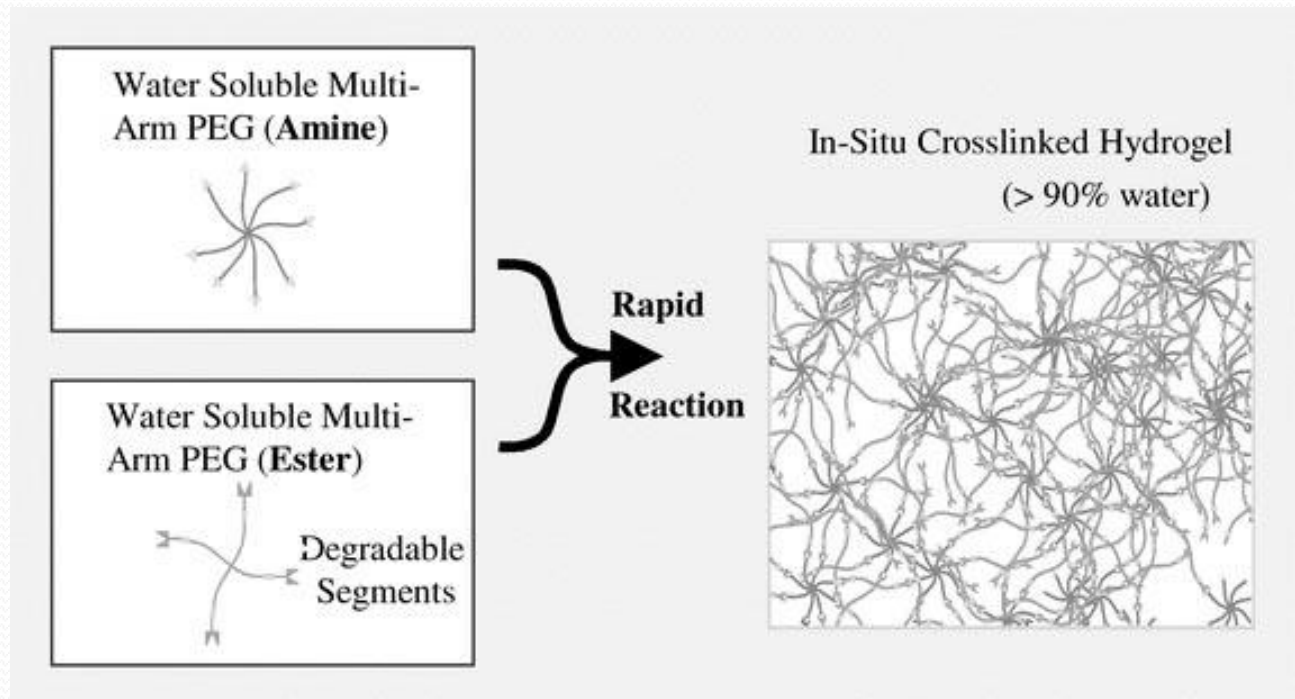




# SprayGel / Shield

(Polyethylene Glycol Polymer, Confluent)

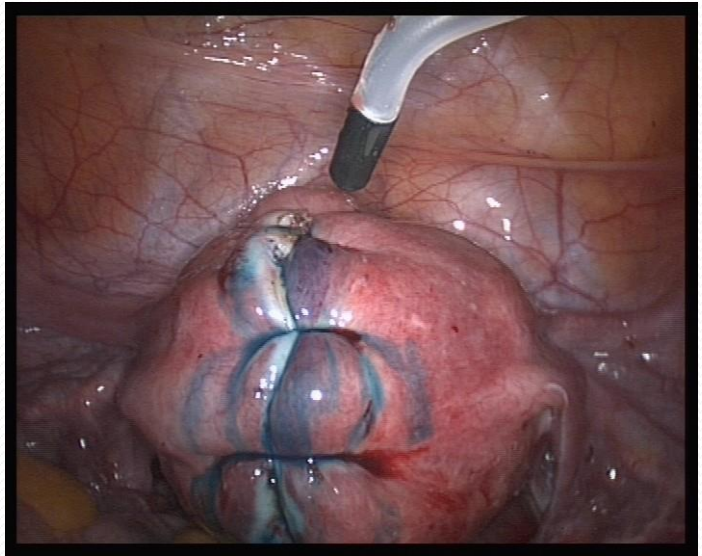
- Polymerization



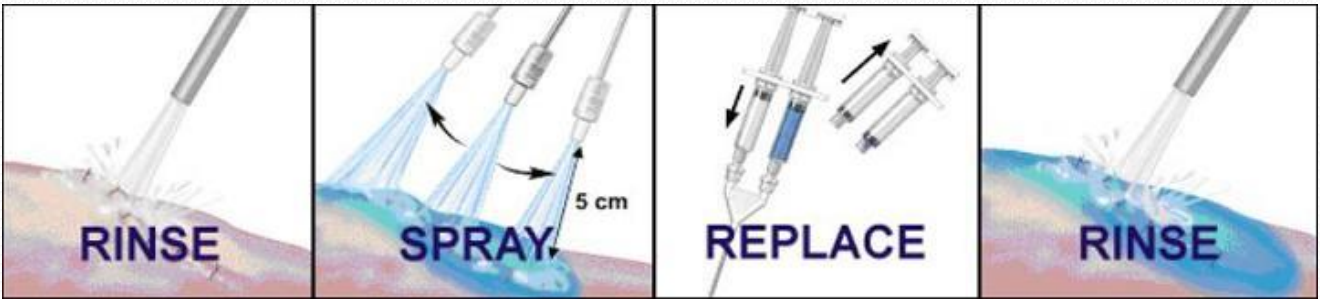
- Methylene blue to show where it is used

# SprayGel / Shield (Polyethylene Glycol Polymer, Confluent)

## Laparoscopic Kit



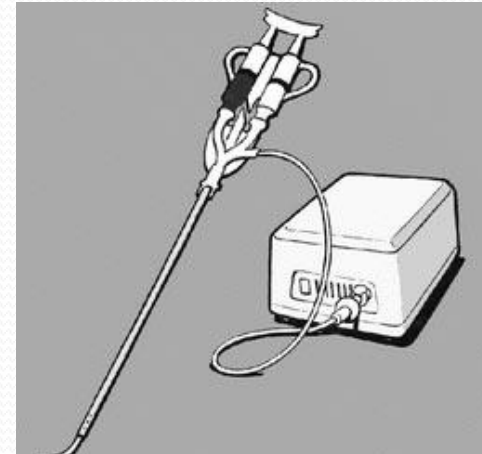
Requires specialised air pump



## SprayShield(Polyethylene Glycol Polymer, Covidien)

### ● Limitations

- complex set-up
- time consuming
- cost.....



# Adept® Icodextrin 4% solution

## Hydroflotation mechanism



## Adept use

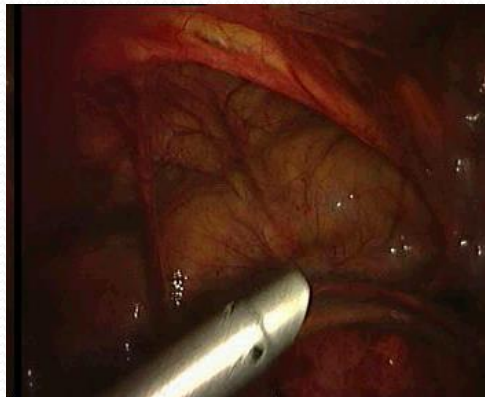
The hydroflotation principle of **ADEPT** is very good but should best be used in a combined approach with the absorbable anti-adhesion barrier on “hyaluronidase basis” as “Hya-Corp endogel” as the solution volume absorbed is about 35ml/h and to be used within first 36 hour – a crucial time period in adhesion formation.

### ■ Irrigation

- minimum 100ml / 30min
- Laparoscopy through the scope
- Laparotomy via a syringe

### ■ Instillation

- 1000 ml at closure



# Prophylaxis

- A forehand adopted preventive procedure
- Adoption of routine Prophylaxis depends on:
  - 1. Impact of strategy on adherence related re-admissions.
  - 2. cost of strategy in comparison with adherence related re-admissions.



# Cost-effectiveness

- Costs of adhesion-related Small Bowel Obstruction
  - Conservatively treated £1,606 (mean stay 7 days)
  - Surgically treated £4,677 (mean stay 16 days)
  
- Adhesion reduction technologies may reduce costs

# Adhesions are inevitable

- **High risk of adhesion-related problems**
- Small bowel obstruction
- Female infertility
- Chronic and debilitating pelvic pain
- Reoperative complications



- International Adhesions Society Patient Survey\*
- In only 10.4% of cases are adhesions mentioned as part of informed consent process
- In 14.4% of cases adhesions discussed but not part of consent
- Adhesiolysis patients
- 54% given some information before surgery
- 46% given specific information about anti-adhesion agents
- In non-adhesiolysis procedures only 10% patients advised about adhesions
- Only 6% given information on anti-adhesion agents

**Role of laparoscopy in identifying the clinical significance and cause of adhesions and chronic pelvic pain: a retrospective review at the Kiel School of Gynecological Endoscopy.**

**JSLs 2007; 11:303-308**

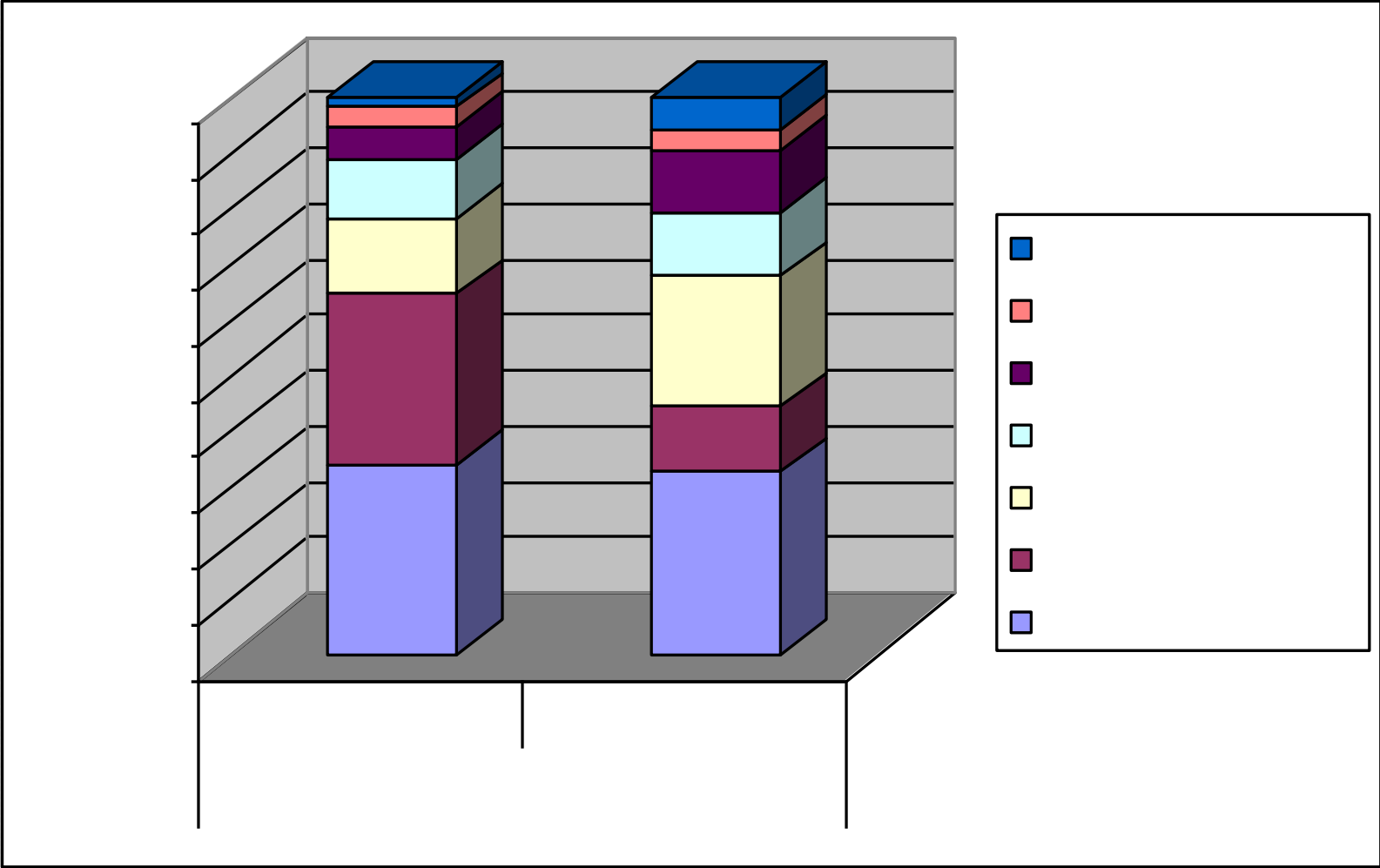
**L. Mettler and M. Al Hujeily**

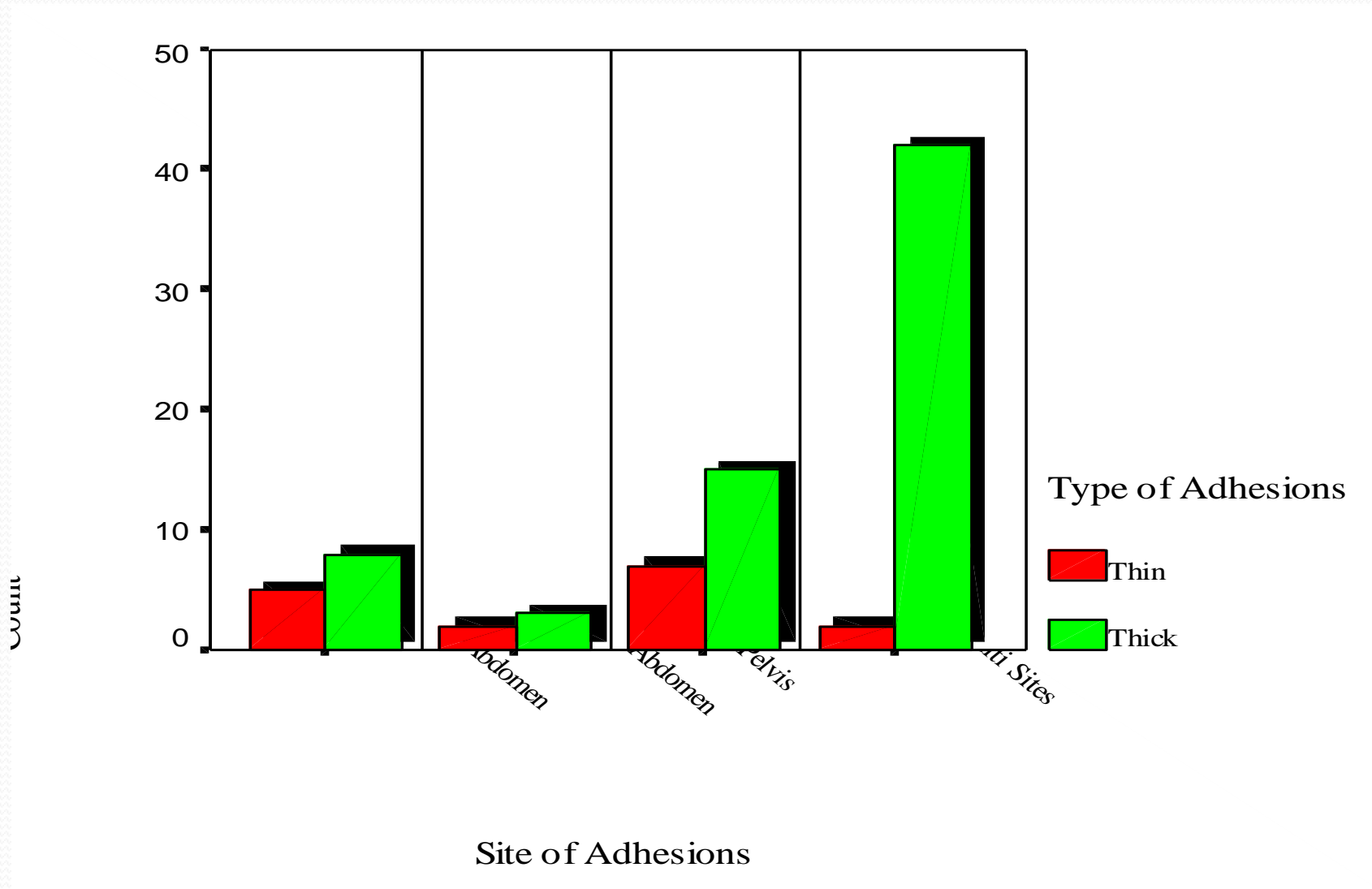
## Reason for Admission Vs. Presence of Adhesions

		Presence of Adhesions		Total
		Yes	No	
<b>Reason for Admission</b>	<b>Ovarian Surgery</b>	94(34.2%)	61(32.6%)	155(33.5%)
	<b>Pelvic Pain</b>	84(30.5%)*	22(11.8%)	106(22.9%)
	<b>Myomectomy</b>	37(13.5%)	44(23.5%)	81(17.5%)
	<b>Infertility</b>	29(10.5%)	21(11.2%)	50(10.8%)
	<b>Tubal Surgery</b>	17(6.2%)	21(11.2%)	38(8.2%)
	<b>Hysterectomy</b>	9(3.3%)	7(3.7%)	16(3.5%)
	<b>Rest of Procedures</b>	5(1.8%)	11(5.9%)	16(3.5%)
<b>Total</b>		275(100%)	187(100%)	462(100%)

		Time Interval of Previous Surgery			Total
		0-5 yrs	5-10 yrs	> 10 yrs	
Past Surgical History	> One Previous Surgery	9(4.7%)	4(2.1%)	56(29.0%)*	69(35.8%)
	Appendectomy	2(1.0%)	3(1.6%)	47(24.4%)	52(26.9%)
	Myomectomy	7(3.6%)	3(1.6%)	5(2.6%)	15(7.8%)
	Diagnostic Laparoscopy	6(3.1%)	3(1.6%)	4(2.1%)	13(6.7%)
	Ovarian Surgery	2(1.0%)	2(1.0%)	7(3.6%)	11(5.7%)
	Tubal Ligation	1(0.5%)	2(1.0%)	4(2.1%)	7(3.6%)
	Hysterectomy	1(0.5%)	1(0.5%)	3(1.6%)	5(2.6%)
	Ectopic Pregnancy	1(0.5%)	0(0.0%)	3(1.6%)	4(2.1%)
	Other Surgical Procedures	1(0.5%)	3(1.6%)	13(6.7%)	17(8.8%)
<b>Total</b>		30(15.5%)	21(10.9%)	142(73.6%)	193(100%)

		Time Interval of Previous Surgery			Total	
		1-5 yrs	5-10 yrs	> 10 yrs		
Past Surgical History	> One Previous Surgery	7(10.4%)	1(1.5%)	25(37.3%)	33(49.3%)	
	Appendectomy	2(3.0%)	0(0.0%)	9(13.4%)	11(16.4%)	
	Myomectomy	2(3.0%)	1(1.5%)	2(3.0%)	5(7.5%)	
	Tubal Ligation	1(1.5%)	1(1.5%)	3(4.5%)	5(7.5%)	
	Diagnostic Laparoscopy	1(1.5%)	0(0.0%)	2(3.0%)	3(4.5%)	
	Ovarian Surgery	1(1.5%)	0(0.0%)	1(1.5%)	2(3.0%)	
	Hysterectomy	1(1.5%)	0(0.0%)	0(0.0%)	1(1.5%)	
	Other Surgical Procedures	0(0.0%)	1(1.5%)	6(9.0%)	7(10.4%)	
	<b>Total</b>	15(22.4%)	4(6.0%)	48(71.6%)	67(100%)	





# HyaCorp endogel

- Represents a Hyaluronic Acid (HA) based product.
- which proved to be an excellent Anti-Adhesion Barrier Gel.
- Is accredited in Europe (CE0297).
- At the German Medical Center, Dpt. Obstet. Gynecology, Dubai, Healthcare City, it is used in 31 patients at the end of the laparoscopic procedures of myomectomies, endometriosis surgery, total and subtotal laparoscopic hysterectomies as well as in cases of adhesiolysis.
- No side effects were observed.
- 2 patients had a second look laparoscopy within 4 weeks and showed no adhesions on the suspected areas



# Hya Corp endogel

## Advantages:

1. A cross-linked Hyaluronic Acid product: which insures a long duration – from 7 seven days to 10 ten days – ( the crucial period in adhesion formation ) ( effective product in adhesion prevention ).
2. Absorbable, Biocompatible ( HA is a natural componenet of body tissues ), Non-Animal origin ( bacterial fermentation ).
3. Easy application: 10ml pre-filled syringe with 30cm cannula for endoscopy operations , 18G needle for open suregries/ortho-surgeries.
4. Is used in Gynacology, abdominal, orthopedic surgeries.
5. Is used for following Gynacology operations: cystic fibrosis, fibroid uterus, hysterectomy or hysteroscopy, removal of ovaries ( ovariectomy ), caesarean section, cystectomy in endometriosis cases, myomectomy.
6. Is used for following Ortho-operations: hand and foot surgeries which involves tendons post operative related complications, and spine surgery.