

# Center for Reconstructive Urethral Surgery



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# **IX International Course on Advances in Urology**

**Valencia - Spain**

**February 3 – 6, 2010**

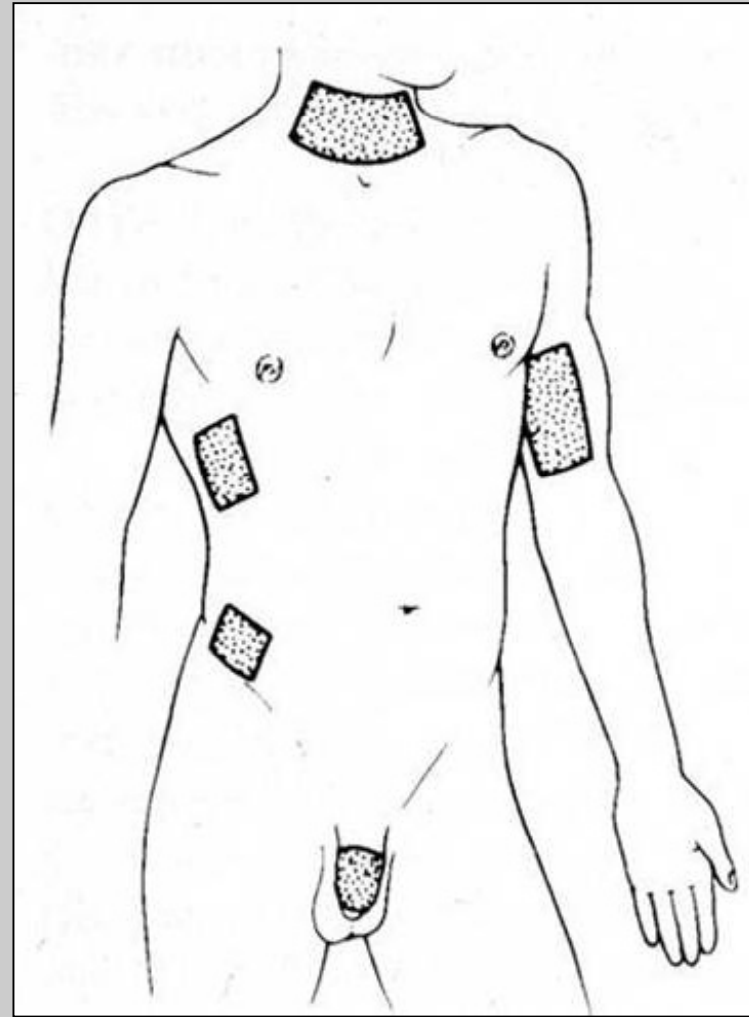
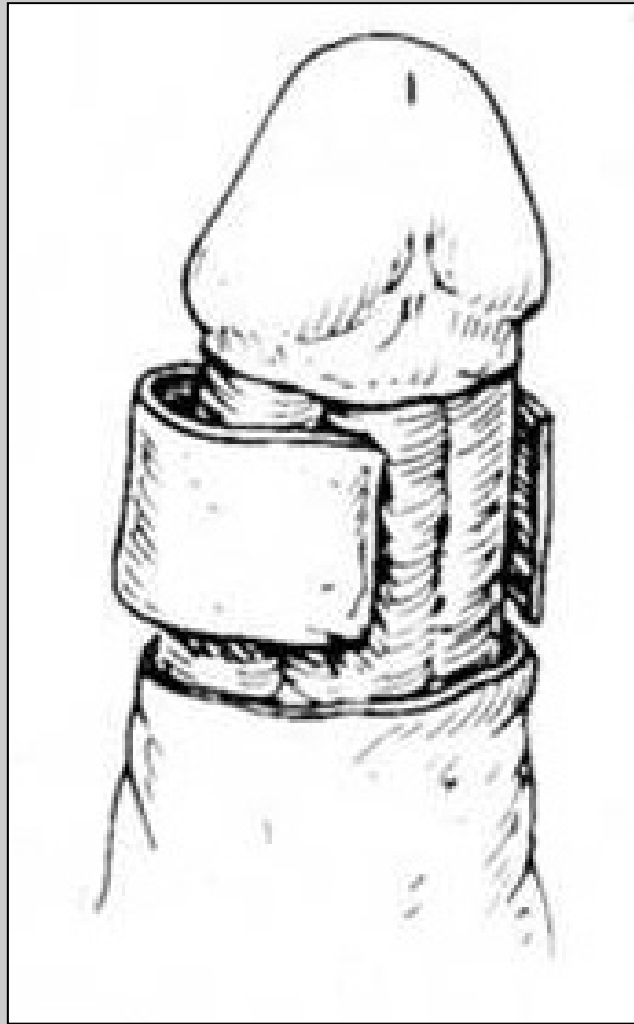
**Which is the best current urethral  
substitute?**

# Substitute material for urethroplasty

1. Genital or extragenital skin
2. Bladder mucosa
3. Oral mucosa
4. Colonic mucosa
5. Other material
6. Tissue engineered material



# 1. Genital or extragenital skin



# 1. Extragenital skin

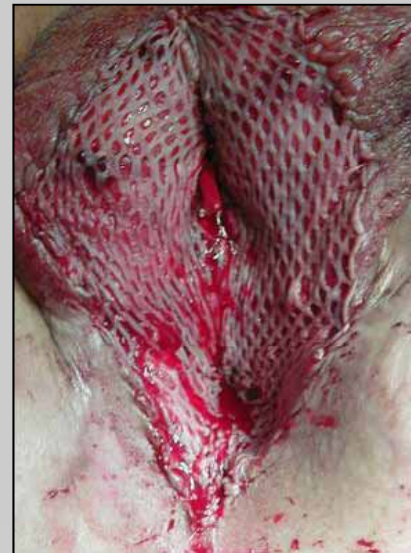
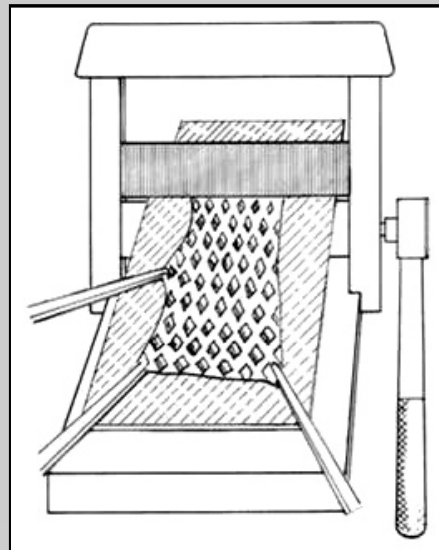
retroauricular (A.R. Mundy)



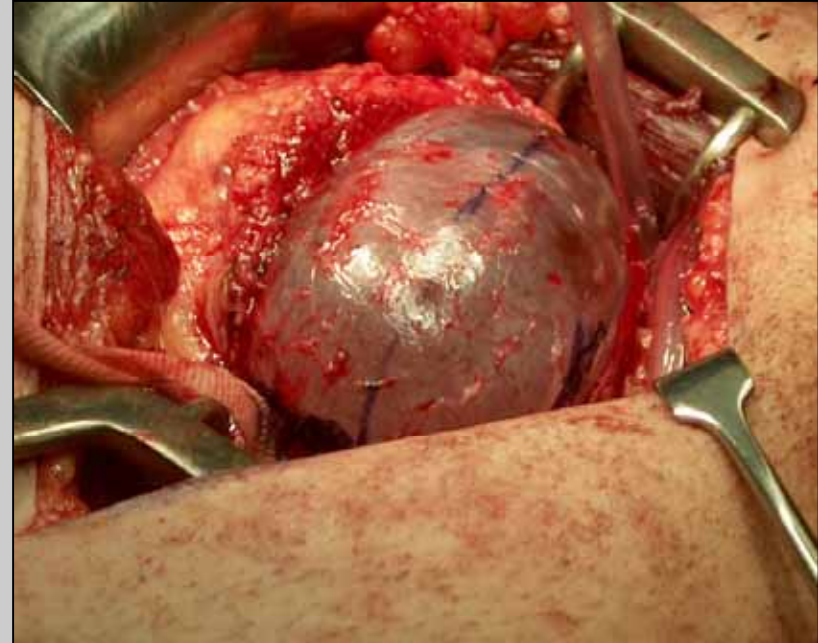


# 1. Extragenital skin

mesh-graft (F. Schreiter)



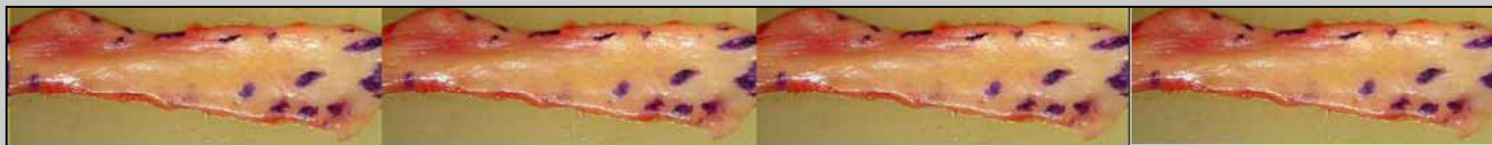
## 2. Bladder mucosa



**In the era of robotic surgery, it is no longer necessary to open the abdomen of the patient to repair all types of urethral strictures !**



### 3. Oral mucosa



4 cm

16 cm x 2.5 cm

### 3. Colonic mucosa

#### Urethral Reconstruction Using Colonic Mucosa Graft for Complex Strictures

Yue-Min Xu,\* Yong Qiao, Ying-Long Sa, Jiong Zhang, Qiang Fu and Lu-Jie Song

**J Urol 2009; 182: 1040-1043**



## 4. Other material

### **The Tunica Vaginalis Dorsal Graft Urethroplasty: Initial Experience**

**Roberto C. Foinquinos, Adriano A. Calado, Raimundo Janio, Adriana Griz, Antonio Macedo Jr, Valdemar Ortiz**

**Internazionale Braz J Urol 2007; 33: 523-531**

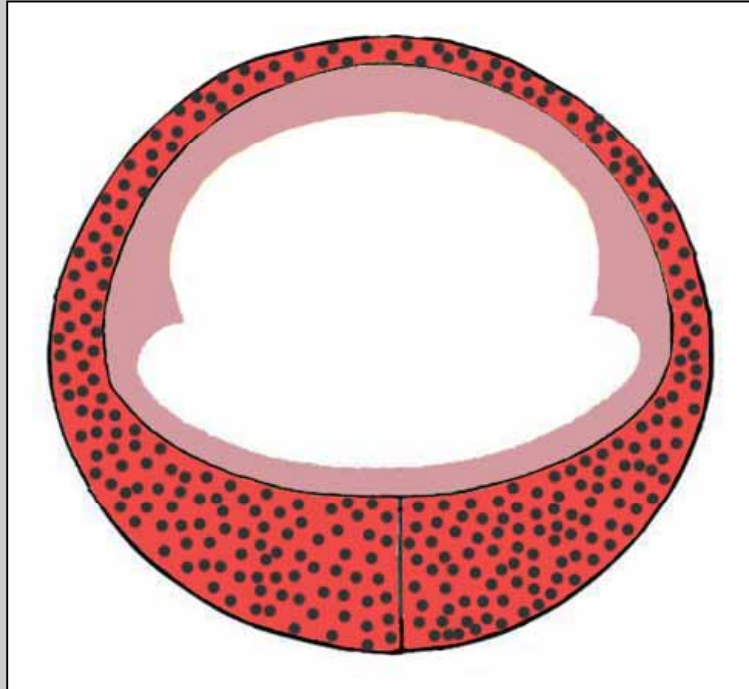
### **SMALL INTESTINE SUBMUCOSA IN URETHRAL STRICTURE REPAIR IN A CONSECUTIVE SERIES**

**STEFAN HAUSER, PATRICK J. BASTIAN, GUIDO FECHNER, AND STEFAN C. MÜLLER**

**Urology 2006; 68: 263-266**

**anecdotal reports**

## 6. Tissue engineered material



Urethral surgery will have improved only when corpus spongiosum is made available and a new **spongiosum-made urethra** is transplanted into the patient.

# **Substitute material for urethroplasty**

## **Skin or oral mucosa?**

**The literature on this topic does not provide any sure guidelines:**

- ❖ old reports**
- ❖ no homogeneous series of patients**
- ❖ different surgical techniques**
- ❖ different criteria for evaluation of the results**



# Substitute materials for urethroplasty



**Anatomical, biological and clinical differences between skin  
and oral mucosa**

# Harvesting site

**Oral mucosa**  **concealed**

**Skin**  **visible to the naked eye**



**esthetic consequences**



**psychological sequelae**

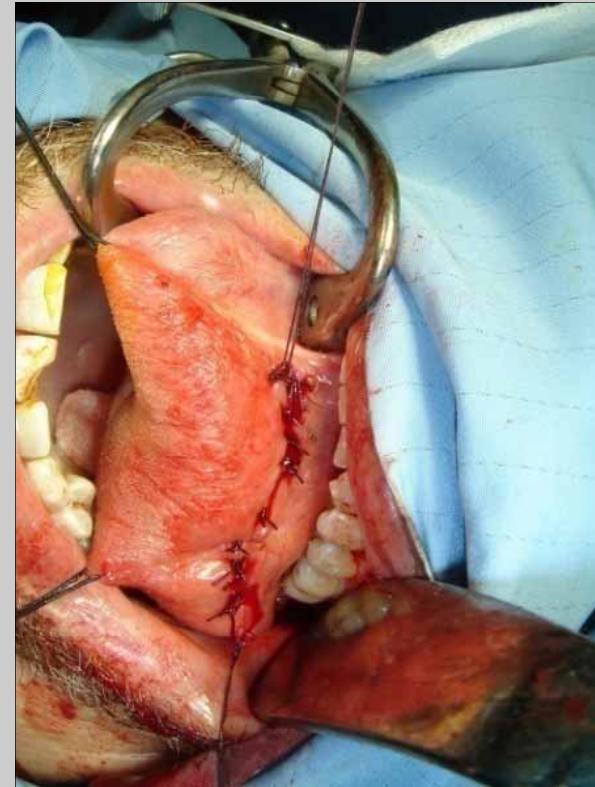
**Harvesting site from the lip: visible to the naked eye**



**Negative esthetic consequences**

**Unsatisfactory post-operative patient acceptance**

# Oral mucosa: harvesting site



**concealed**

## Skin: harvesting site

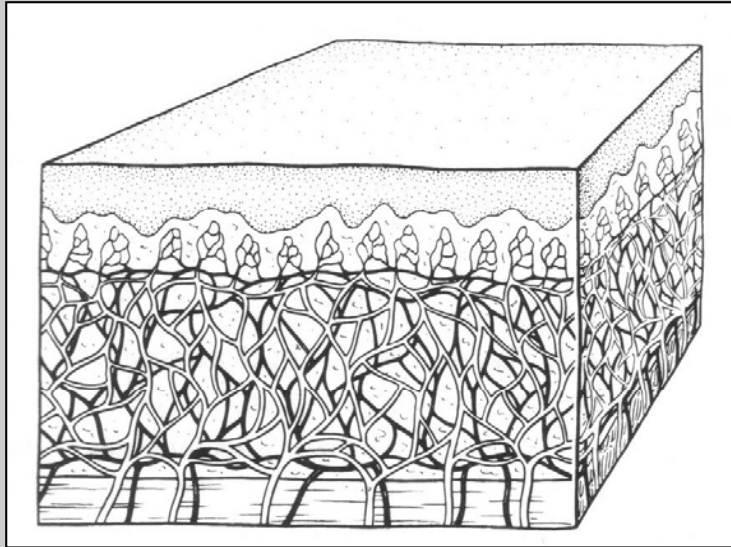


visible to the naked eye



# Biological characteristics

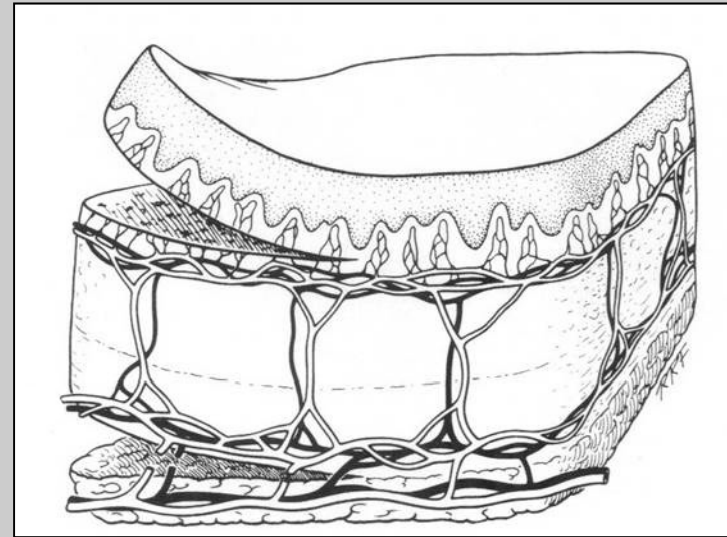
## Oral mucosa



**Thick epithelium**

**Slightly vascular lamina propria**

## Skin



**Thin epithelium**

**Thick avascular lamina propria**

**Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197**

# Oral mucosa: biological characteristics

## Resistant to infection



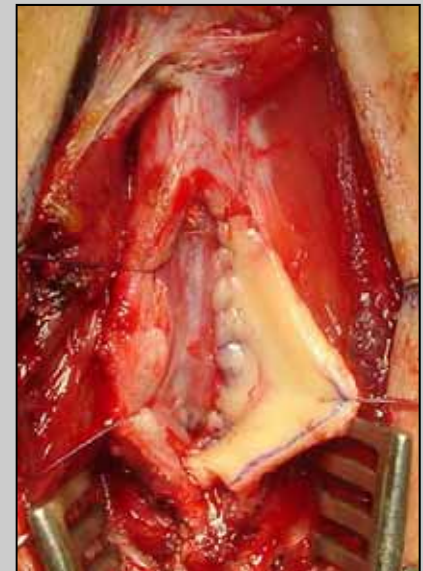
- ❖ Oral mucosa hosts a number of micro-organisms, yet the tissue's inflammatory response to these organisms is minimal.
- ❖ There are multiple immunological processes intrinsic to the oral mucosa that makes it impervious to native flora colonization.

Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

# Oral mucosa: biological characteristics

## Compatible with the urethral environment

- ❖ Histologic studies have demonstrated that the oral mucosa is highly compatible with the urethral recipient site, at times being indistinguishable from the surrounding tissues
- ❖ The structural integrity of oral mucosa remained intact following transplantation to distant site



Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197

# Oral mucosa: biological characteristics

## Elastic and resilient



**Frequently exposed to compression, stretching and shearing forces, the oral mucosa is highly resilient, due to his particular lamina propria-oral epithelium interface.**

**Markiewicz MR et al, EAU-EBU UPDATE SERIES 2007; 5: 179-197**



# Oral mucosa: biological characteristics

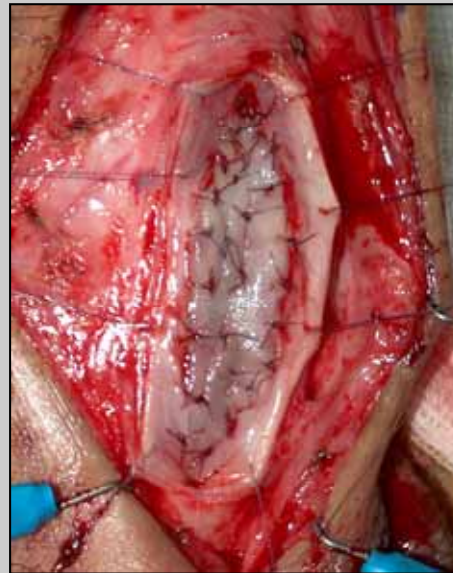
Easy to adapt for any type of urethroplasty



**One-stage**



**Two-stage**



**Inlay**



**Onlay**



# Oral mucosa: biological characteristics

Rarely affected by lichen sclerosis



Andrich DE and Mundy AR, Eur Urol 2008; 54: 1031-1041

# Oral mucosa: evidence in the literature

## **The Oral Mucosa Graft: A Systematic Review**

**Michael R. Markiewicz,\* Melissa A. Lukose, Joseph E. Margarone, III, Guido Barbagli, Kennon S. Miller and Sung-Kiang Chuang**

**Markiewicz MR et al, J Urol 2007; 178: 387-394**

**In the literature, 1,267 articles on the use of oral mucosa in urethral reconstruction have been reported (1966-2006).**

# The use of oral mucosa in urethral surgery

Why ?



**The patient does not want to be  
considered an experimental  
animal**

**Substitute material for urethroplasty**

**Skin or oral mucosa?**

**Comparative evaluation of the results**

# Penile one-stage inlay graft urethroplasty

## Results

type of repair	success
oral graft	81.8%
skin graft	78.3%

Barbagli G. et al, BJU Int 2008; 102: 853-860



# Bulbar one-stage onlay graft urethroplasty

## Results

type of repair	success
oral graft	82.8%
skin graft	59.6%

Barbagli G. et al, Eur Urol 2008; 53: 828-833

# Harvesting oral mucosa: how to avoid complications



**cheek**



**lip**



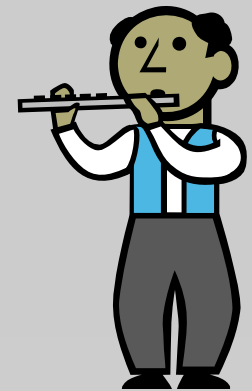
**tongue**

## Site conditions which do not permit oral mucosa harvest



# Site conditions which do not permit oral mucosa harvest

- ❖ Patients who have an infectious disease affecting the mouth (candida, varicella-virus or herpes virus)
- ❖ Patients with pathological oral dermatosis
- ❖ Patients with morsicatio buccarum (cheek chewing)
- ❖ Patients who had previous surgery on the mouth or tongue
- ❖ Patients who play a wind instrument
- ❖ Patients who chew tobacco or pan masala (India)



## Two surgical teams work simultaneously





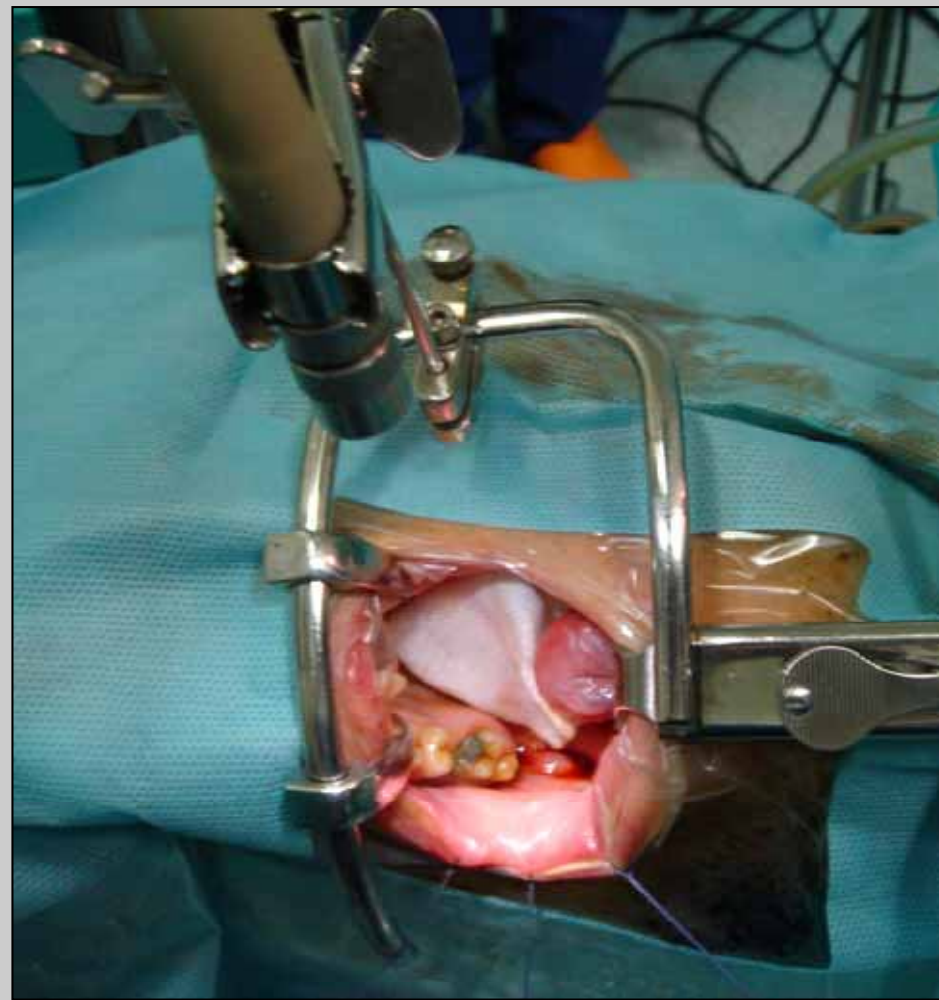
## Two sets of surgical instruments



**Oral mucosa**



**Urethroplasty**



**Appropriate mouth retractor with its own light**



**Only one assistant is needed to harvest the oral graft**

e-mail: [info@urethralcenter.it](mailto:info@urethralcenter.it)

website: [www.urethralcenter.it](http://www.urethralcenter.it)



# Advantages of the double team



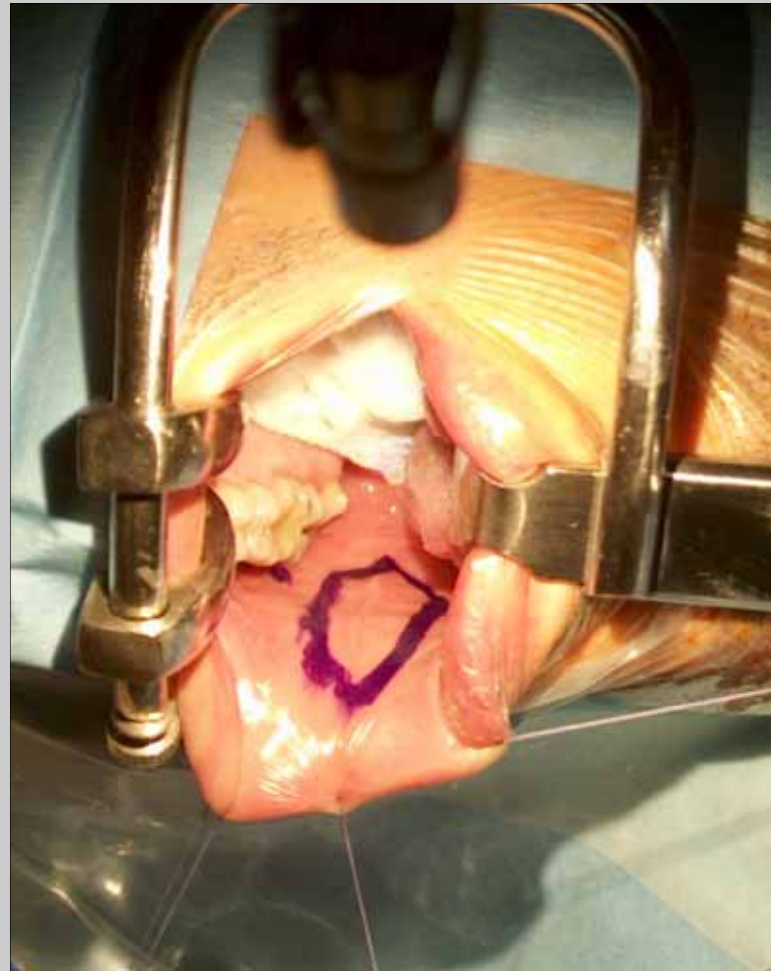
```
graph TD; A[Advantages of the double team] --> B[decrease in surgical time of ~ one hour]; A --> C[decrease in contamination in surgery]; A --> D[provides training opportunity for the young assistant interested in learning urethral surgery];
```

**decrease in  
surgical time  
of ~ one hour**

**decrease in  
contamination in  
surgery**

**provides training  
opportunity for the young  
assistant interested in  
learning urethral surgery**

# Harvesting oral mucosal graft from the cheek

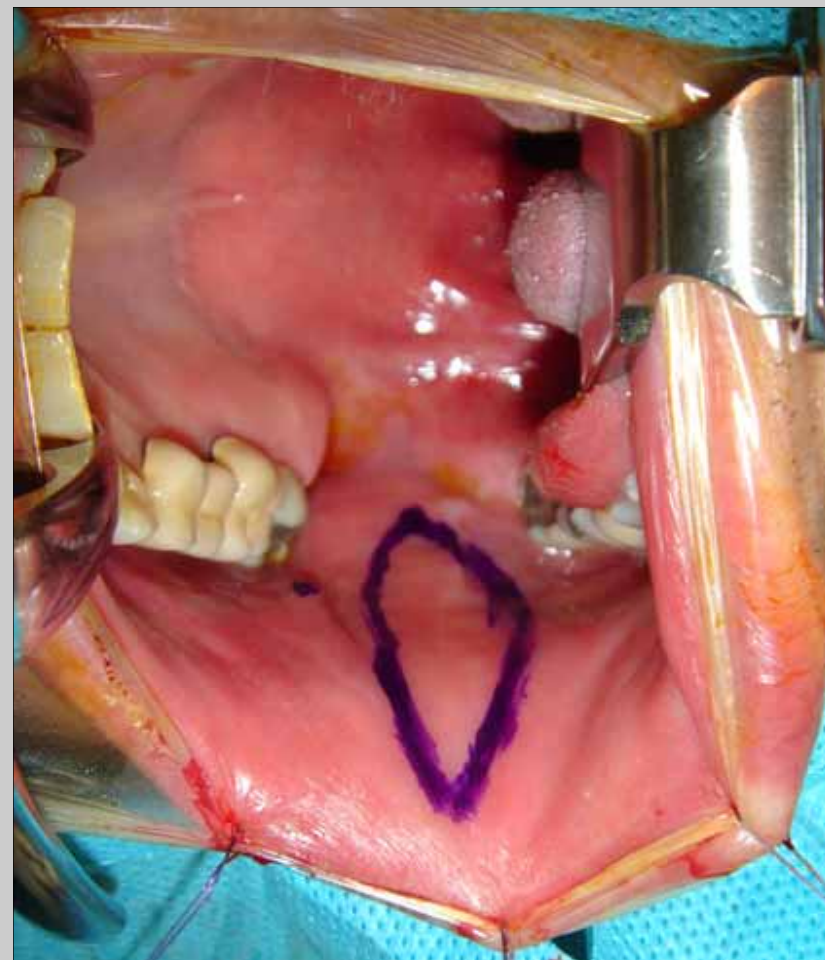
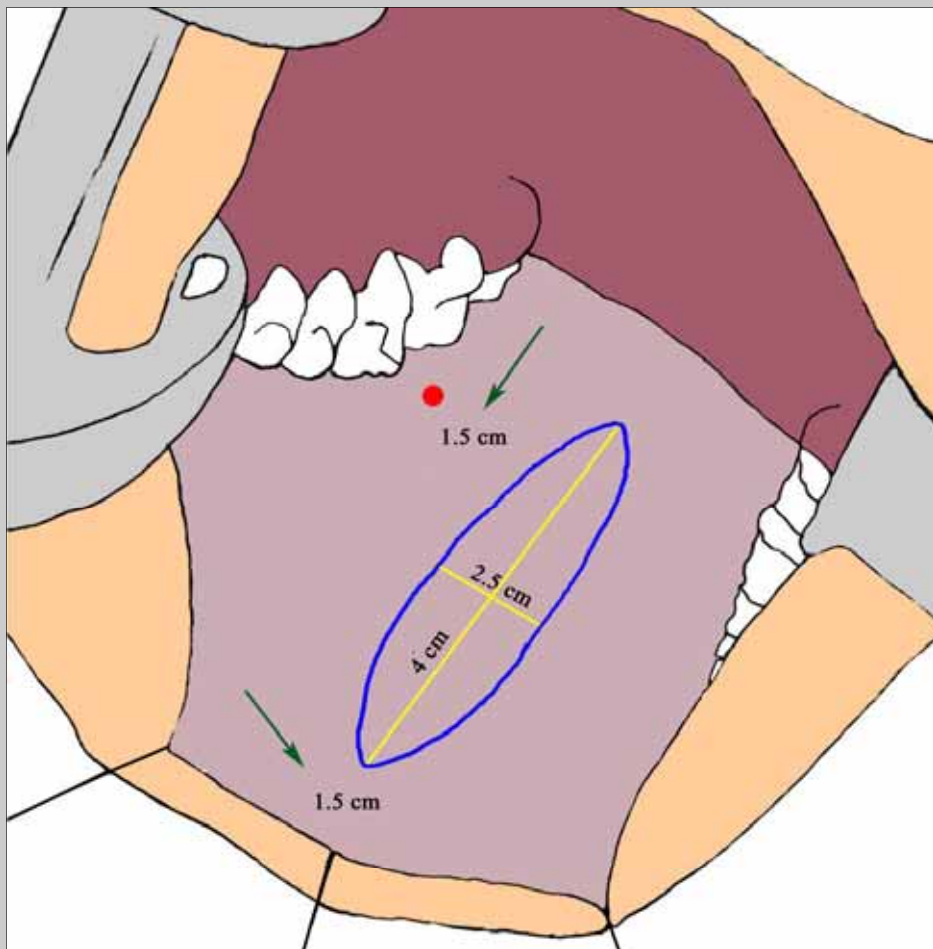


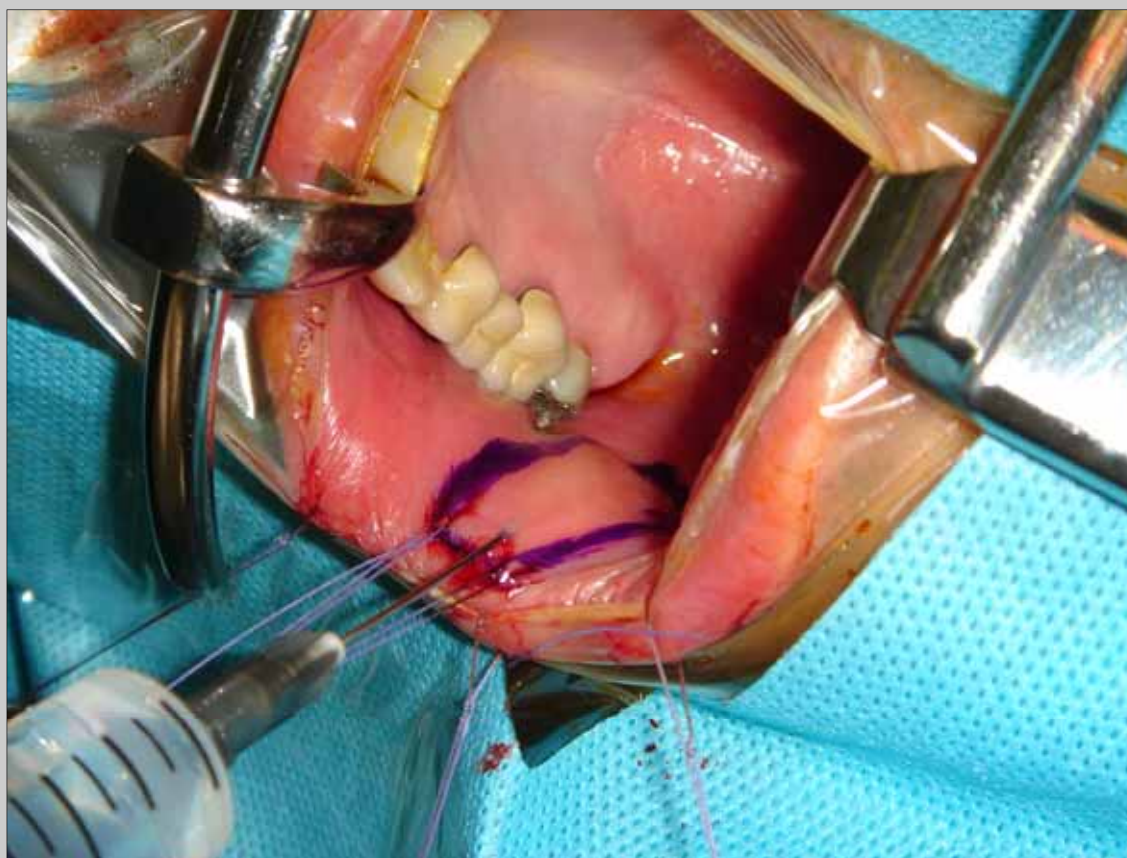
**Surgical steps**



**The patient is intubated through the nose,  
allowing the mouth to be completely free**

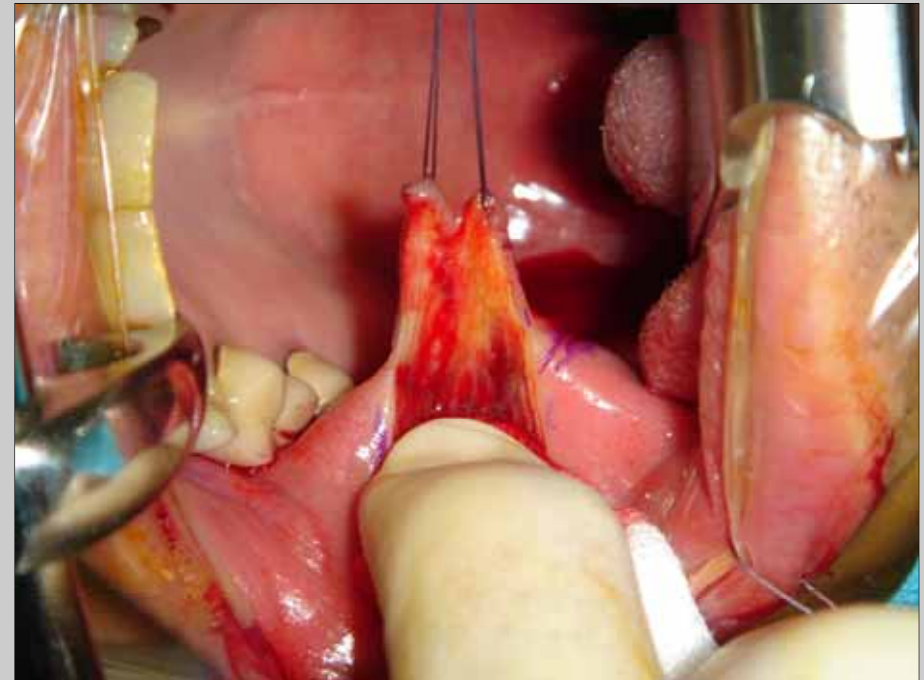
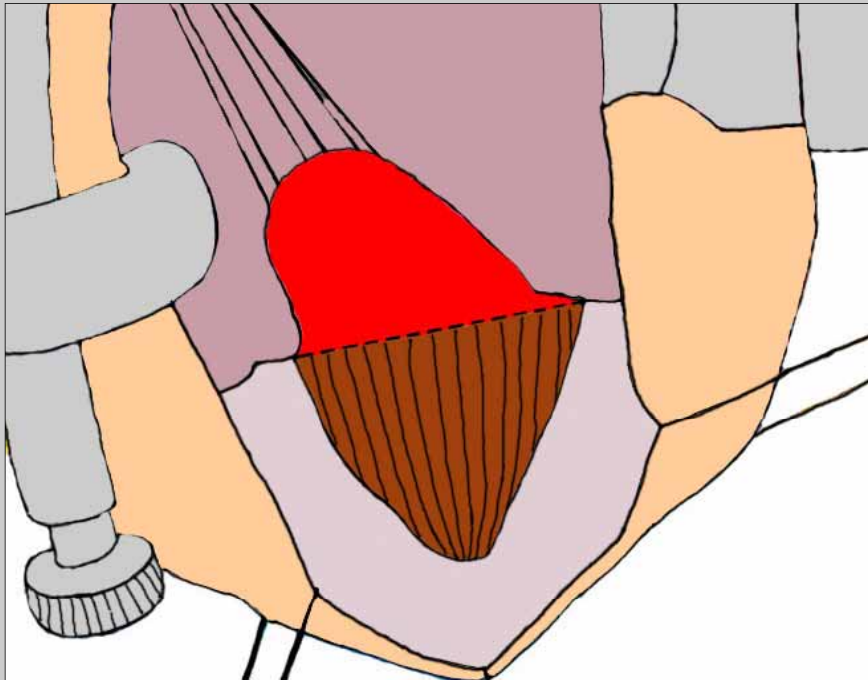


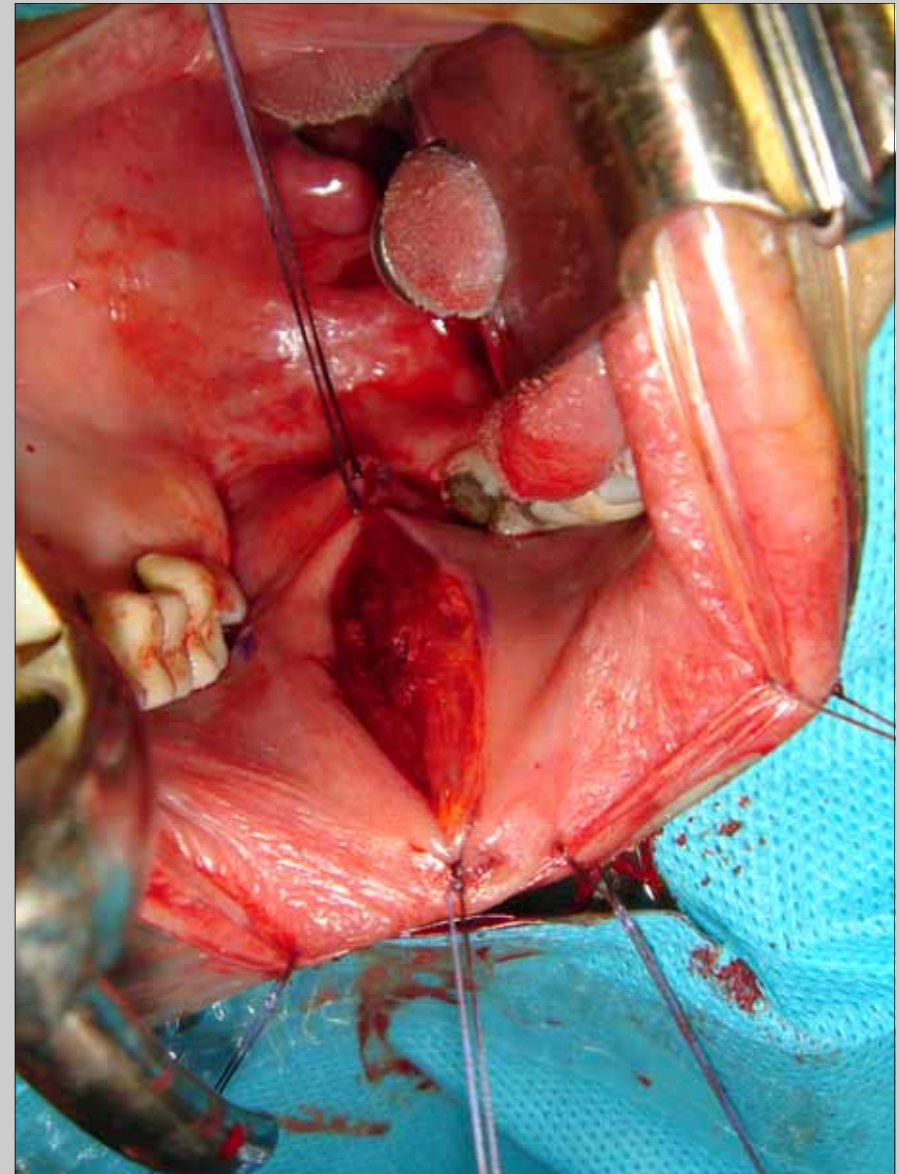
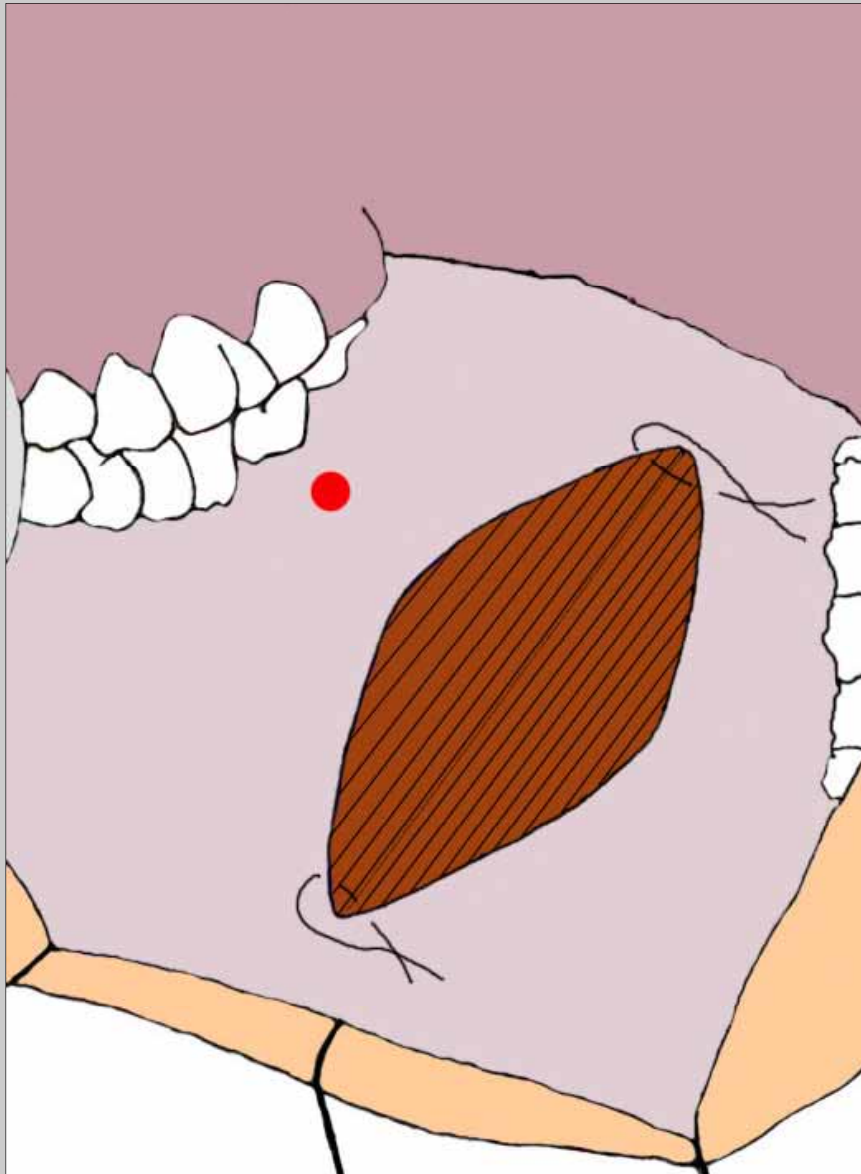




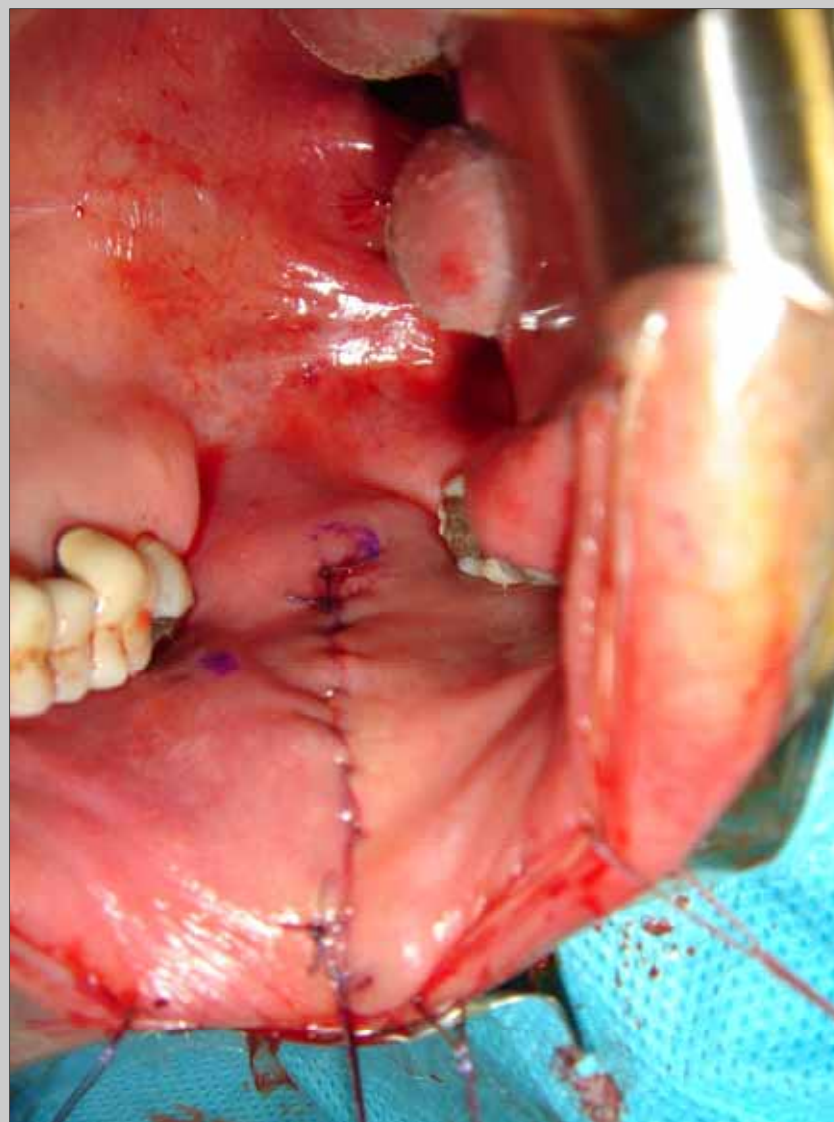
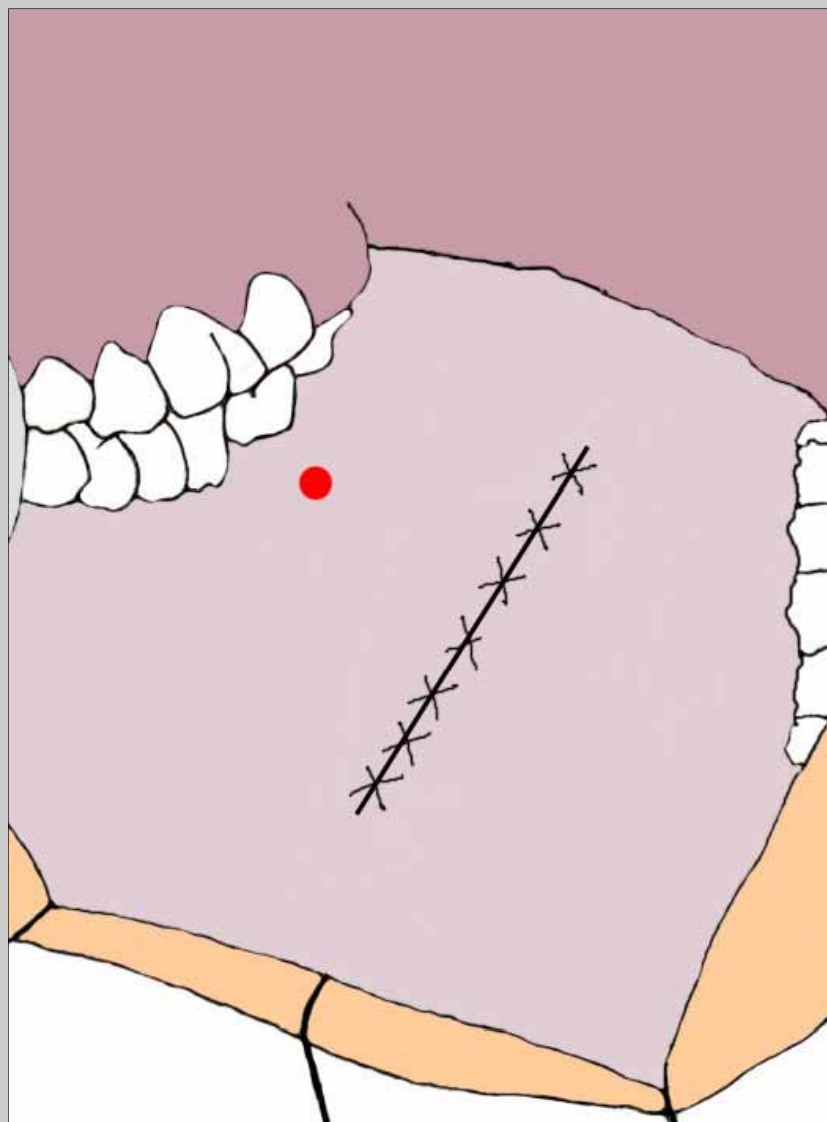
**Lidocaine HCL 1% with epinephrine (1:100,000)**



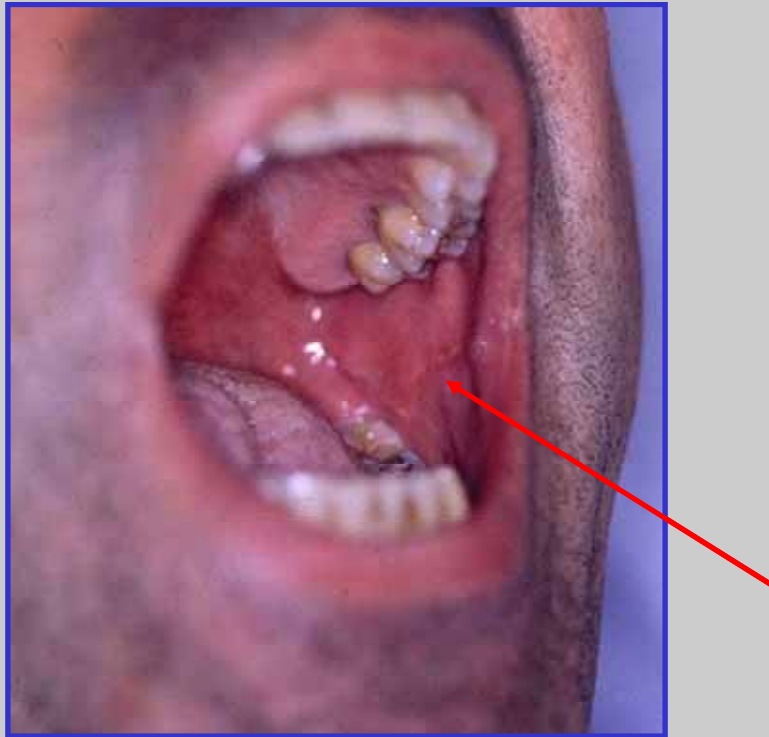








# Morbidity of oral mucosa graft harvesting from a single cheek



Barbagli G. et al, Eur Urol 2010; in press

# Early complications in 350 patients

**bleeding:** 4.3%

**pain:** none 49.2, slight 36%, moderate 13.7%, severe 1.1%

**swelling:** none 33.7%, slight 41.2%, moderate 24.6%, severe 0.5%

**use of anti-inflammatory drugs for oral pain:** 3.7%

Barbagli G. et al, Eur Urol 2010; in press

## Early complications in 350 patients

**58.6%** patients were able to resume a normal diet  
within 3 days

**31.4%** patients were able to resume a normal diet  
within 6 days

**10%** patients were able to resume a normal diet  
within 10 days

Barbagli G. et al, Eur Urol 2010; in press

# Late complications in 350 patients

**infection: 1.7%**

**perioral numbness:** for one week 73.4%, for one month 22.9%,  
for three months 3.7%

**discomfort related to the tightness of suture closure:** none 48%, slight 40.3%,  
moderate 10.9%, severe 0.8%

**discomfort due to mouth scar:** none 82.8%, slight 14.6%, moderate 2.6%,  
severe 0%

Barbagli G. et al, Eur Urol 2010; in press



# Late complications in 350 patients

**difficulty with mouth opening:** none 98.3%, slight 1.4%, moderate 0.3%, severe 0%

**difficulty smiling:** none 99.7%, slight 0.3%, moderate 0%, severe 0%

**dry mouth:** none 97%, slight 2.6%, moderate 0.4%, severe 0%

Barbagli G. et al, Eur Urol 2010; in press

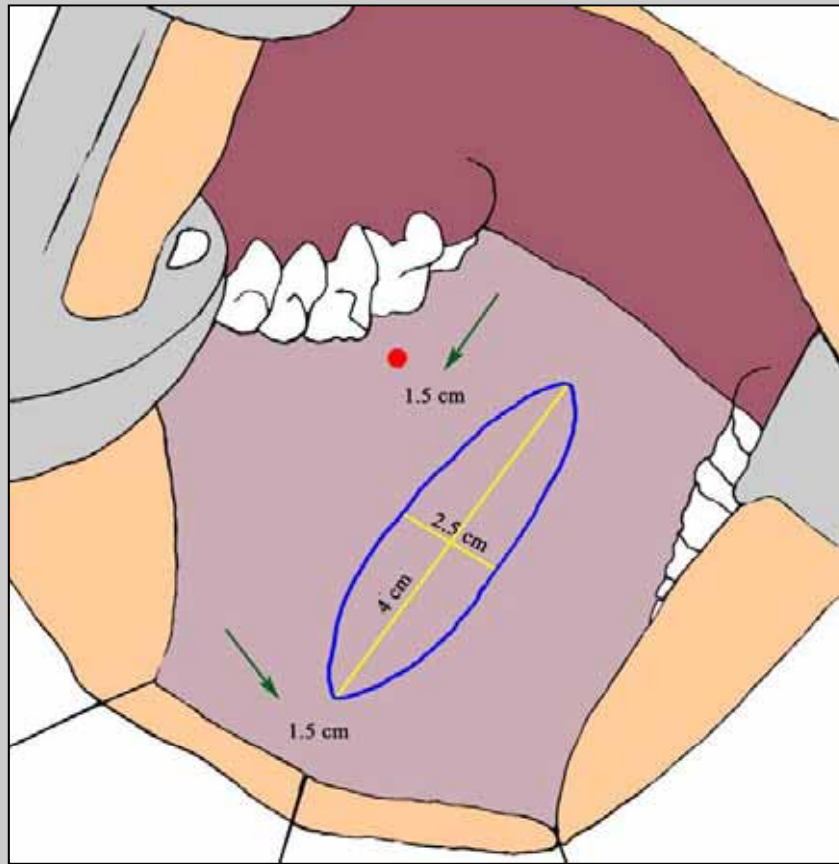
## **Patient satisfaction**

**“ Would you undergo oral mucosa graft harvesting using this technique again? ”**

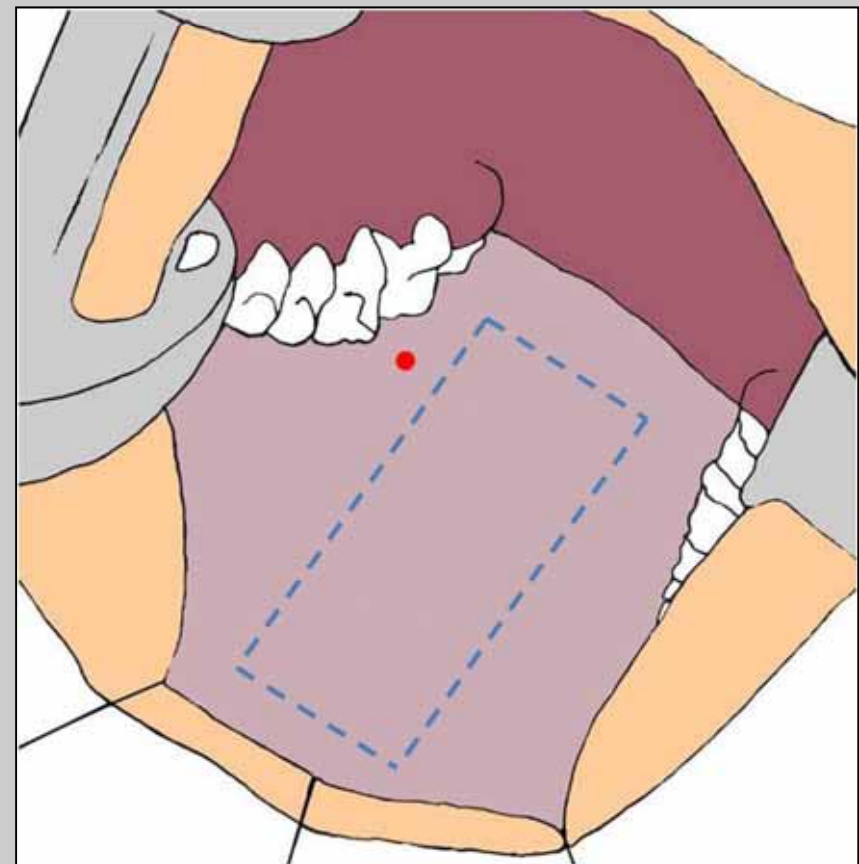
**Yes : 98% of patients**

**No : 2% of patients**

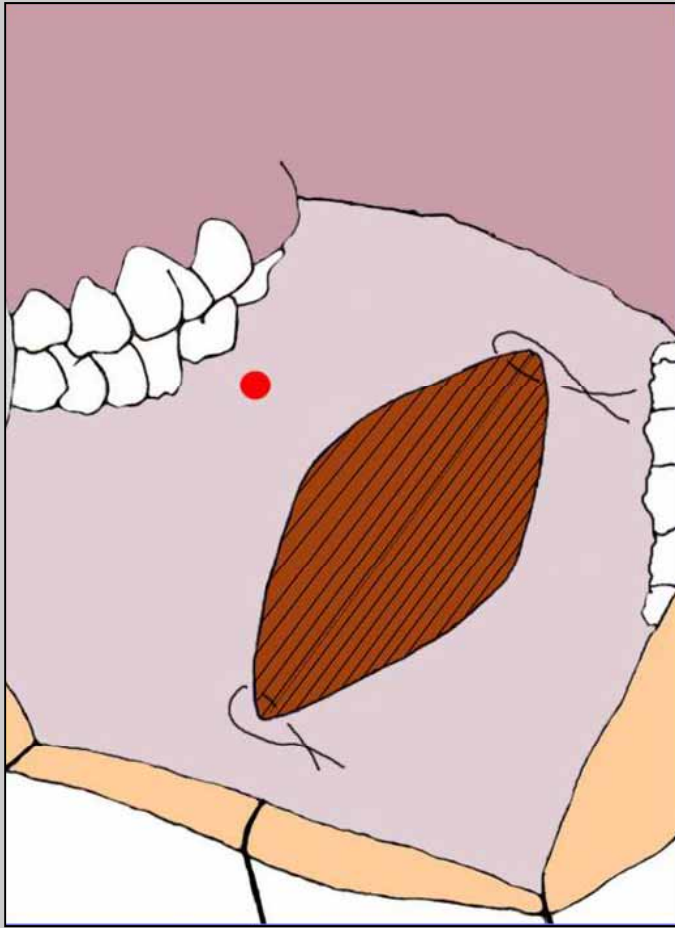
**Barbagli G. et al, Eur Urol 2010; in press**



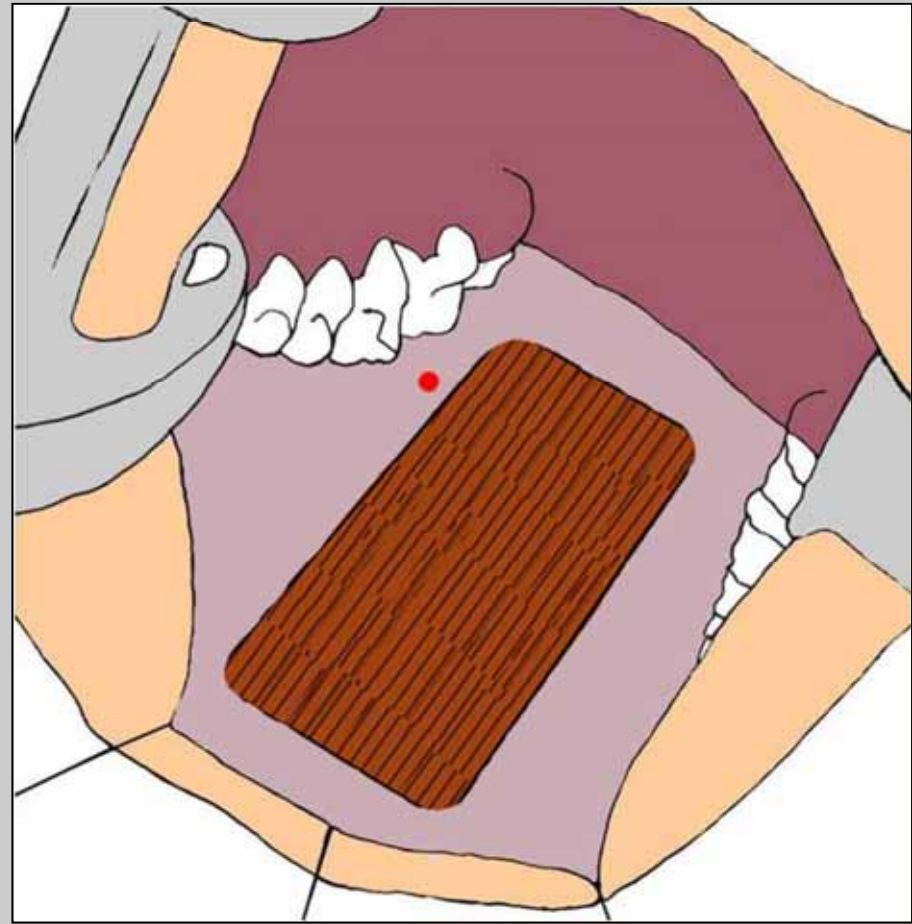
**Ovoid shape**



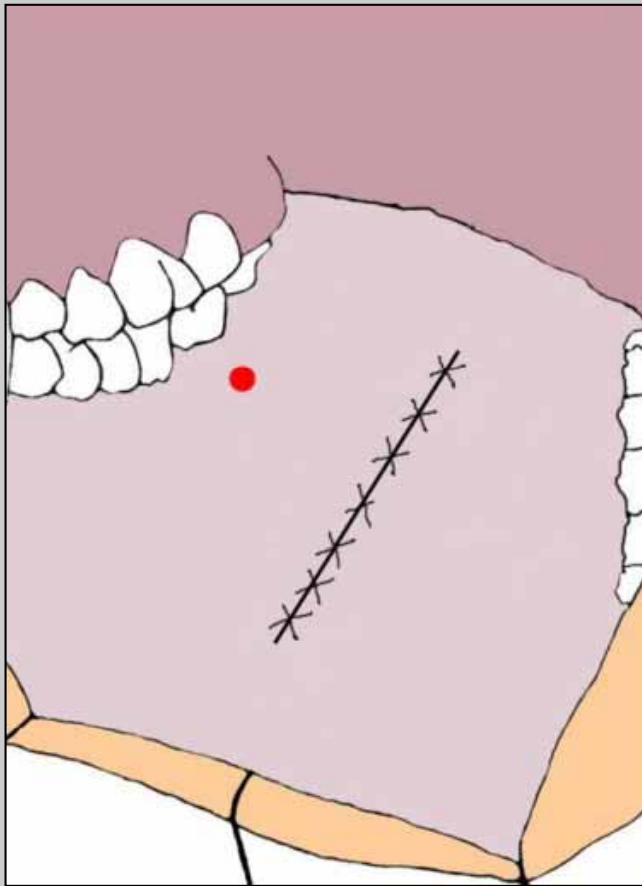
**Rectangular shape**



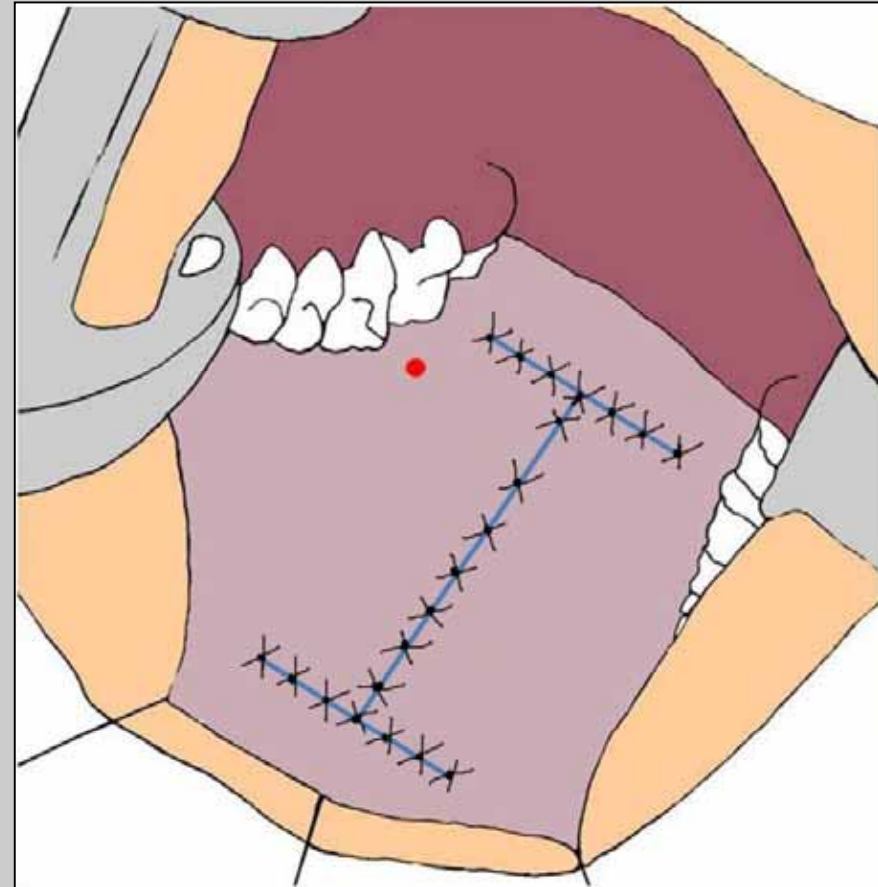
**Ovoid shape**



**Rectangular shape**



**Ovoid shape**



**Rectangular shape**





- ❖ The **cheek** represents the best harvesting site in the mouth.
- ❖ Low post-operative morbidity and excellent patient satisfaction.
- ❖ Numerous articles reported in the literature.

# Harvesting oral mucosal graft from the tongue



## Surgical steps

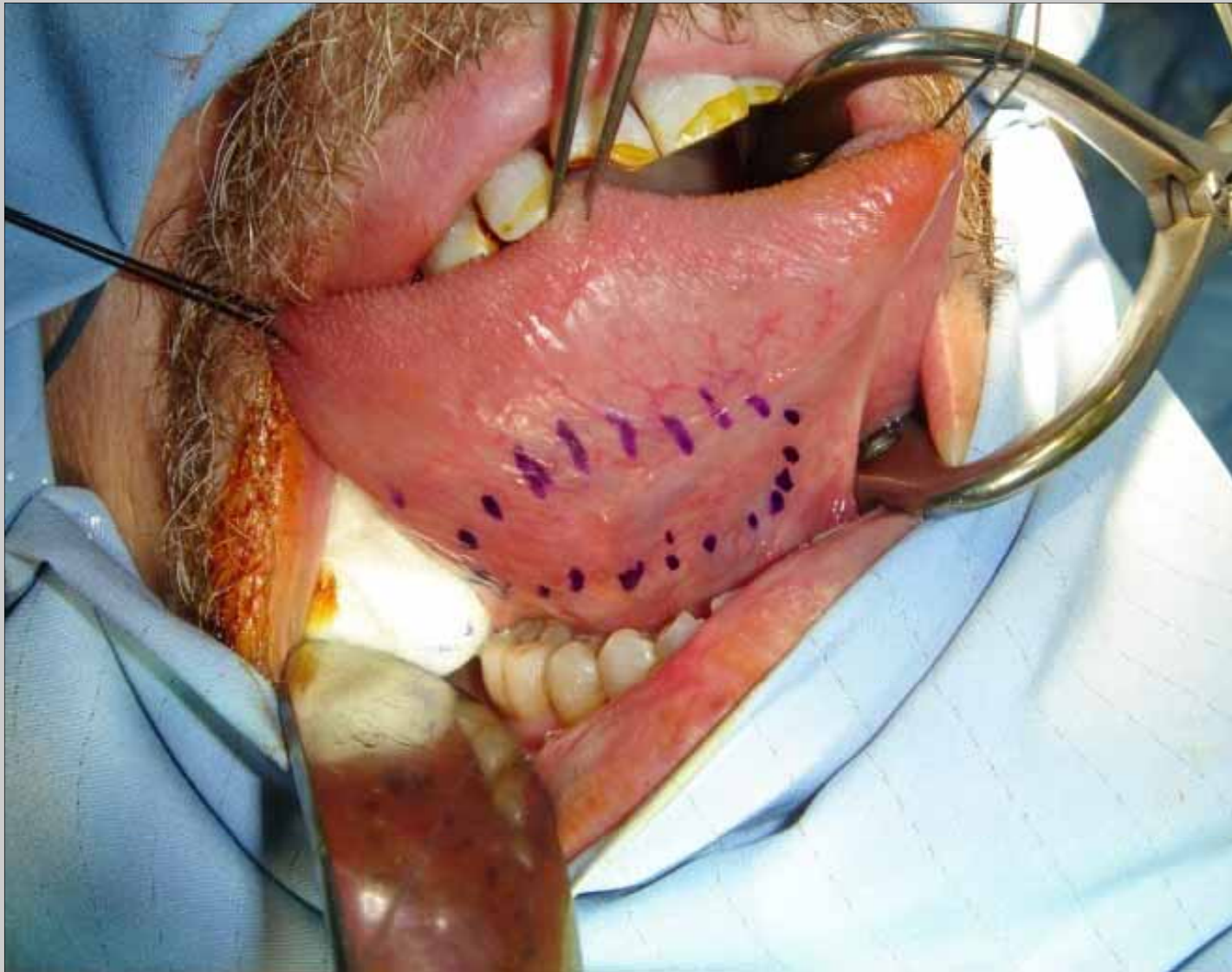


## Wharton's duct

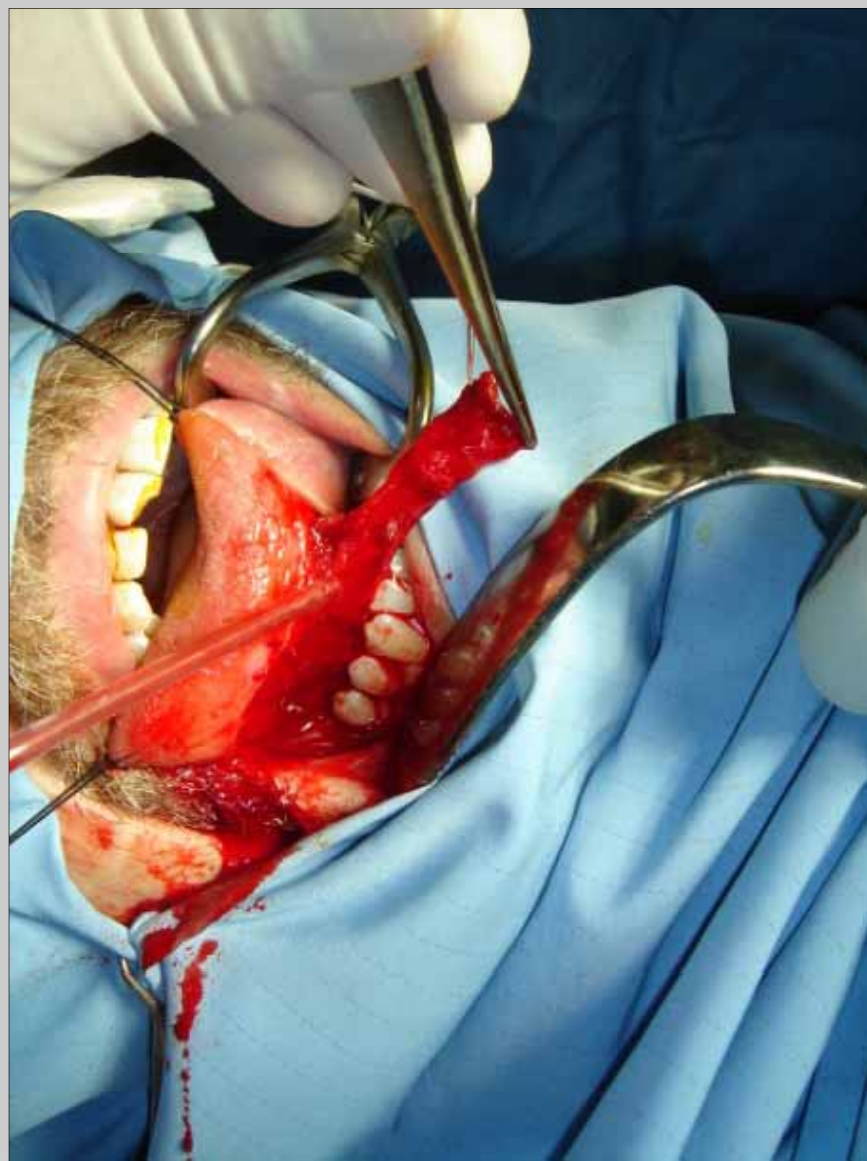


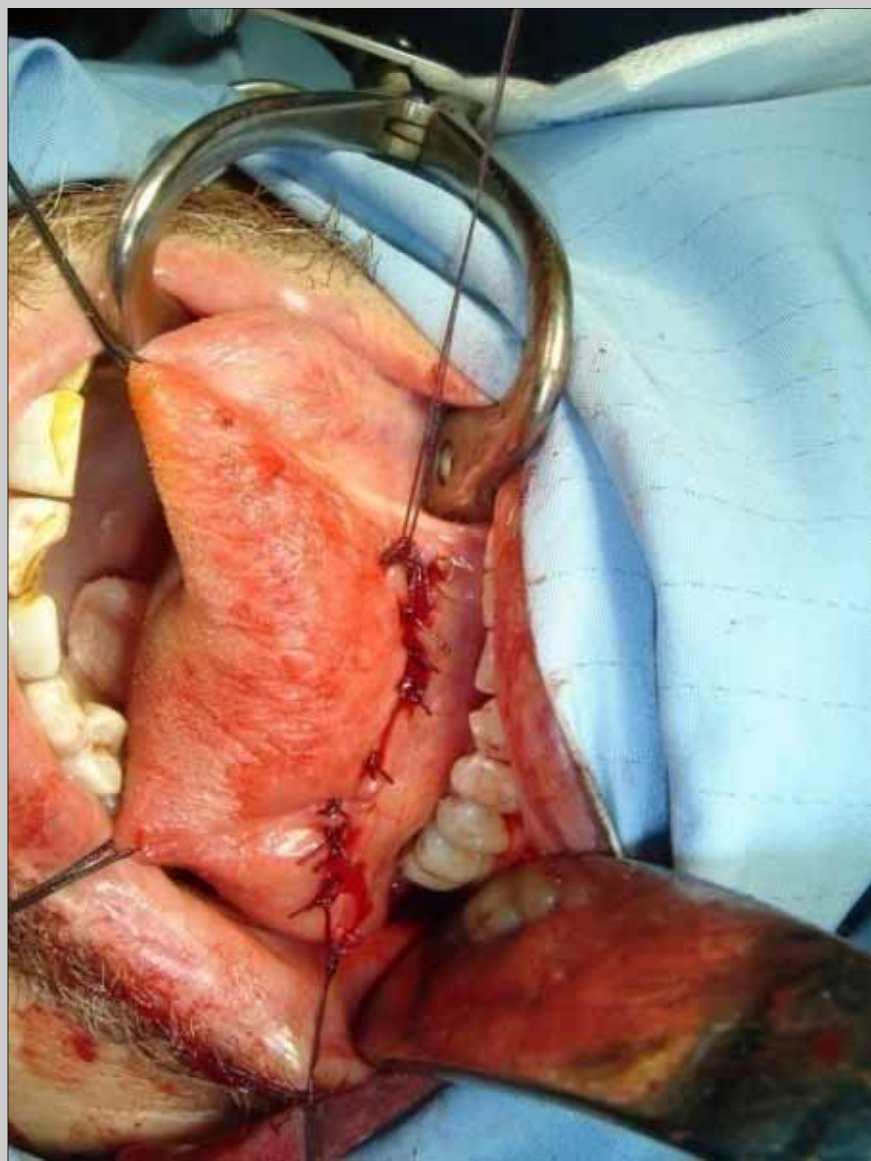


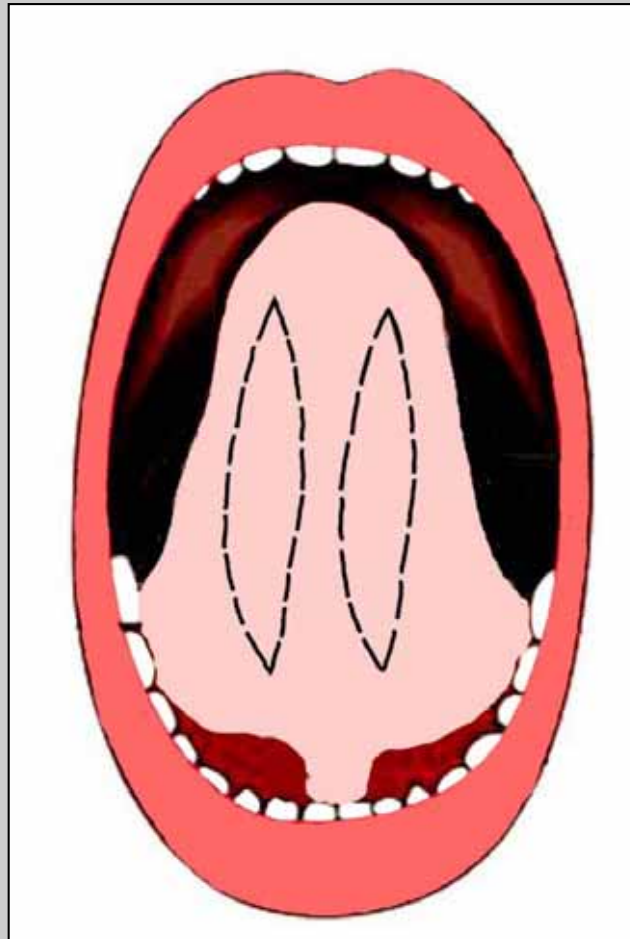
## Lingual nerve



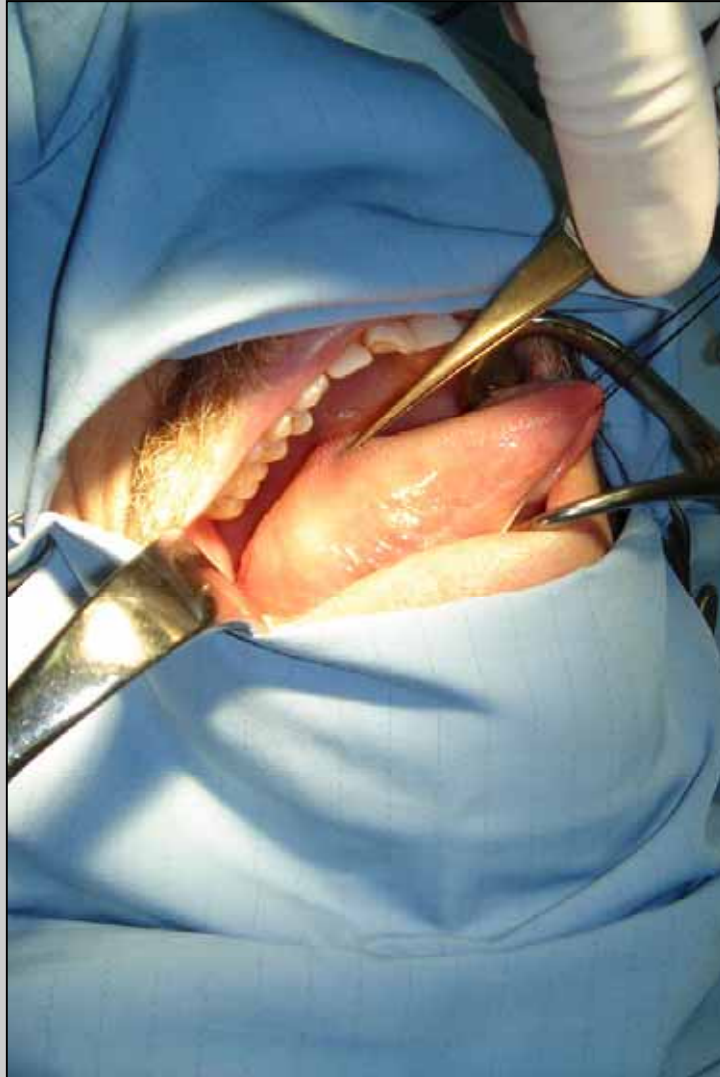








## Double graft harvesting



- ❖ The **tongue** represents the best alternative to the cheek.
- ❖ Few reports in the literature.



THE BRITISH JOURNAL OF SURGERY  
A ONE-STAGE OPERATION FOR HYPOSPADIAS

BY GRAHAM HUMBY

F.M.S. SURGEON AND SURGICAL ASSISTANT TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

WITH A FOREWORD BY

T. TWISTINGTON HIGGINS

SURGEON TO THE HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET

**Humby G, Br J Surg 1941; 29: 84-92**



# Conclusion

- ❖ At the present time, oral mucosa represents the best material for urethroplasty.
- ❖ Using oral mucosa grafts, it is possible to repair the majority of anterior urethral stricture diseases.
- ❖ Oral morbidity in patients who underwent oral graft harvesting from a single cheek is low and patient satisfaction is high.

# Conclusion

- ❖ In selected cases, the use of extragenital or genital skin represents the only alternative to the oral mucosal graft.
- ❖ The skin may be harvested in different sites, according to patient and stricture characteristics:
  - preputial - penile skin
  - retroauricular skin (A.R. Mundy)
  - mesh-graft skin (F. Schreiter)

# **In the era of robotic surgery, it is also time to change urethral surgery!**



- ❖ **Increase the use of minimally invasive techniques in urethroplasty, reducing the incidence of complications and improving patient quality of life.**
- ❖ **Increase the use of appropriate questionnaires to better evaluate the outcome of urethroplasty.**

# Evaluation of the results

objective



subjective

**If you don't look for complications following surgery,  
you won't find complications !**