History and Basic Concepts of Mohs Surgery

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Greetings from The Skin Doctors’ Center Trieste, Italy
Mohs’s Surgery: The Origin
Mohs Micrographic Surgery History And Evolution - USA (I)

**1930 : FIRST CONCEPTS**
Frederic E. Mohs research assistant at Dept. of Zoology of the University of Wisconsin, USA

**1941 : FIRST PUBLICATION**
Mohs FE, Guyer MF: Pre-excisional fixation of tissues in the treatment of cancer in rats Cancer Res 1:49-51, 1941

**1941 : OFFICIAL PRESENTATION**

**1948 : TECHNICAL DEVELOPMENTS**

**1974 : FRESH TISSUE TECHNIQUE**
Mohs’ Micrographic Surgery is a…

**3D - CCDMA**

- Complete Circumferential and Deep Margins Assessment Surgical Excision

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The Mohs’ Method (modified)

...allowing a High Cure Rate while preserving maximal uninvolved healthy tissue **when properly performed**

Fresh Tissue Technique

Slow Mohs Technique

Tubingen Torte Method
1977 : EVOLVING INDICATIONS

1986 : EVOLVING INDICATIONS

1988 : EVOLVING INDICATIONS

1989 : EVOLVING INDICATIONS

1997 : EVOLVING INDICATIONS
Mohs’ Professional Associations in the US

Founded - 1967
Mohs Micrographic Surgery: The European Experience (I)

1972 GERMANY: FIRST STEPS

Gunter Burg, Robins P Chemochirurgie, chirurgis entfernung chemisch fixierten tumorgewebes mit mikroskopischer kontrolle. Der Hautartttz, 1972

1977 GERMANY: FIRST DEVELOPMENTS

Birger Konz introduced the fresh tissue technique in Munich (Germany)

1980 PORTUGAL: THE SECOND COLONISATION

Antonio Picoto started to perform Mohs surgery in Lisbon (Portugal)

1981 SPAIN: THE THIRD COLONISATION

Francisco Camacho, Alejandro Camps Fresneda, Julian Sancez Conejo Mir started Mohs surgery in Granada, Barcelona and Seville (Spain)

1984-1986: THE FOURTH COLONISATION

Richard Mothey, Neil Walker, Christopher Zachary started their micrographic surgery practice in Cardiff and London (UK)

1988 GERMANY: INNOVATIVE TECHNIQUE

Helmut Breuninger developed the Tubingen Torte technique (Germany)
The European Society for Mohs Micrographic Surgery (ESMS) was established thanks to the contribution of the following founding members:

Helmut Breuninger, Gunter Burg, Birger Konz – GERMANY
Francisco Camacho, Alejandro Camps-Fresneda – SPAIN
Galvao Costa and Marai Celeste Brito, José Manuel Labareda, A.F. Ribas dos Santos, Paulo Santos, Antonio Picoto – PORTUGAL
Patrick Dierick, Arlette de Coninck, Diane Roseeuw – BELGIUM
Alejandro Ginzburg – ISRAEL
Martino Neumann – THE NETHERLANDS
Olle Larko, Bo Stenquist – SWEDEN
Neil Walker – UNITED KINGDOM
Giorgio Landi, Leonardo Marini – ITALY
Mohs Micrographic Surgery: Continuing Evolution (I)

1977 : NEW DEVELOPMENTS


2000 : NEW DEVELOPMENTS


Surgical excision vs Mohs' micrographic surgery for basal-cell carcinoma of the face: randomised controlled trial


Surgical excision versus Mohs’ micrographic surgery for primary and recurrent basal-cell carcinoma of the face: a prospective randomised controlled trial with 5-years’ follow-up

Lancet Oncol 2008; 9: 1149-56


Interpretation MMS is preferred over surgical excision for the treatment of facial rBCC, on the basis of significantly fewer recurrences after MMS than after surgical excision. However, because there was no significant difference in recurrence of pBCC between treatment groups, treatment with surgical excision is probably sufficient in most cases of pBCC.
Today many Dermatologists performing Mohs Micrographic Surgery follow independent procedural strategies based on the original Mohs’ method mostly re-elaborated by Mohs surgeons who are in charge of teaching and training.

All personalized re-elaborations produce a high level of onchologic success but it is quite difficult to compare their technical advantages and disadvantages since no comparative studies have been performed so far.
Frederic Mohs: The “Origin of the Idea”

Frederic Mohs’ Trainees: First Interpretation of the original Mohs’ concept

Frederic Mohs’ Trainees: further interpretations of original Mohs concept

Frederic Mohs’ concept personalized optimization

Mohs’ Surgery has many technical variations around the World!
Skin Cancers Need to be Treated According to a Standardized Procedural Flow Chart...

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<table>
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<td>1.</td>
<td>Patient medical-surgical HX - UV exposure, Immune competence</td>
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<td>2.</td>
<td>Cancer HX - Primary vs Recurrent, previous treatment(s)</td>
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<td>3.</td>
<td>Cancer clinical assessment - anatomical location, margins assessment</td>
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<td>4.</td>
<td>Cancer preliminary BX - different BX techniques</td>
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<td>5.</td>
<td>Cancer dermatopathological diagnosis (!!!)</td>
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<td>6.</td>
<td>Eradication strategies: Conventional excision, Mohs, PDT</td>
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<td>7.</td>
<td>Mohs technique: standardized sequential steps</td>
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<td>8.</td>
<td>Reconstruction</td>
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<td>9.</td>
<td>Follow-Up</td>
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...in order to be able to obtain a consistent uniformity in Treatment Outcomes
Mohs’ Surgery Procedural Steps

1. Pre-Op Clinical-Photo-Graphic Time (Mohs 1)

- Pre-op “virgin” digital photograph of involved anatomical area (without markings)
- Preliminary assessment + marking of superficial visible margins of skin cancer
- Preliminary assessment + marking of proposed excisional margins
- Identification + marking of main surgical excision orientation axis (vertical horizontal)
- Pre-excisional digital picture with complete markings

2. Surgical Time (Mohs 2)

- Surgical excision of tumour + main orientation axis incisions on peripheral skin
- Surgical specimen positioning on transport tray with main orientation axis
- Pinpoint coagulation with minimal damage to deep and peripheral tissue
- Temporary compressive dressing
3. 3D Histology Time (Mohs 3)

Surgical specimen splitting + differential colour marking of selected borders

Specimen splitting + colour markings reported on Patient Chart

Specimen divided parts manipulation to allow thorough assessment of peripheral and deep margins

Cryo-fixation + microtome cutting

Fast histologic dying

Microscopic assessment + further excision(s) in case of positive margins

4. Reconstruction Time

Evaluation of size + shape + anatomical location of Final Surgical defect

Evaluation of pros and cons of different Reconstructive strategies

Surgical reconstruction

5. Post-Op Follow Up Time

Early and Late post-surgical assessment of healing processes

Early and Late post-Mohs assessment of onchologic effectiveness
MOHS’ Technique

1. Pre-Op Clinical-Photo Graphic Time

2. Surgical Time

3. Laboratory Time

Microscopic comparative assessment
1. Pre-Op Clinical-Photographic Time
2. Surgical Time
3. Laboratory Time
4. Reconstruction Time
5. Post-Op Follow Up Time
Laboratory Time

Specimen sub-division planning

Specimen sub-division numbering

Specimen sub-division marking

Specimen sub-division flattening

Specimen sub-division cryo-fixation

Specimen sub-division sandwitch cryo-compression

Specimen sub-division cryostat cutting

Specimen sub-division histologic staining

Specimen sub-division microscopic reading
Nodular-Infiltrating BCC
Nodular-Infiltrating BCC
Ulcerated infiltrating BCC
Morphea-like BCC
Morphea-like BCC
CAVEAT! SCC – clear margins Mohs surgery:

positive cervical LNs 6 months after surgical procedure
Conclusions

**Mohs Micrographic Surgery** is a highly effective treatment strategy to eradicate non-melanoma skin cancers with a cure rate of 97-99.8% for primitive tumours such as BCC and 93-94% for recurrent BCC

**Mohs’ surgery** is essentially a technical method of tissue handling and processing, the skill and training of the surgeon can greatly affect the end clinical outcome

**Standardization** of sequential steps of Mohs Micrographic Technique is essential to achieve statistically reproducible clinical results

**Thorough analysis of the many variations proposed by Mohs’ Surgeons around the world** should be properly performed in order to distillate the mostly effective approach to be taught in officially approved training programs

**ESMS** should be instrumental in designing and implementing properly standardized training programs to qualify and certify Mohs’ Surgeons in Europe
Let's meet again in Trieste on February 16-18, 2017.

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