

## **Does the patient need Mohs or any other margin controlled surgery?**

Mohs Micrographic Surgery (MMS) is an extremely precise combined surgical and histopathological technique to track and remove tumours that grow by contiguous adjacent spread.

The surgical element is similar to standard excision, but differs in the steps taken to ensure precise orientation. It does not remove tumours cell by cell, but does take the guess work out of choosing excision margins. Subclinical tumour spread can be identified and removed, whilst sparing adjacent uninvolved tissue. A reliable histological result is produced within usually 30-90 mins of excision (depending on size), facilitating rapid same day (often complex) repair with the highest confidence of cure.

Mohs is mostly used for BCC. It may be considered for other tumours where the same principles of growth and desire for sparing tissue apply e.g. poorly defined SCC, DFSP, MAC etc.

'Slow Mohs' is the excision of tumours using complete (100%) margin control with fixed paraffin histopathology and delayed repair another day. This (and other margin controlled methods like the 'Spaghetti technique', 'Tubingen Torte') may be more suitable than frozen section Mohs for large BCC involving bone or LM, DFSP, and are not to be confused with staged excision & delayed repair using standard histopathology with a marker suture (showing at most 5% of the margins). Cure rates are no higher than standard excision/repair with the latter approach.

### **Evidence summary**

A plethora of observational studies involving large numbers of patients have shown 5-year cure rates for MMS of 99-100%. The best RCT evidence (Mosterd et al, Lancet Oncol 2008) showed a 5-year MMS cure rate for primary BCC of 97.5%, and recurrent BCC of 97.6%, involving patients selected by typical MMS criteria. The comparison arm of optimised standard excision (including also serial excision, staged excision with delayed repair or re-excision of positive margins, slow Mohs, and even rescue Mohs in 4%) showed cure rates of 95.9% for primary and 87.8% for recurrent BCC. The same experienced team of Mohs surgeon-pathologists performed all surgery in both arms of the trial.

Thus it can be concluded that nearly equivalent cure rates for previously untreated BCC may be achievable by standard excision or non-frozen section Mohs techniques in experienced hands. However this does not account for a clear potential advantage in cosmetic outcome, reduced complications, patient convenience, and overall cost from a single MMS treatment for appropriate primary tumours.

Notably 18% of primary tumours were incompletely excised by first excision in the standard excision arm of this trial, and 30% of recurrent tumours. This led to a large number of avoidable subsequent procedures, preventable if MMS had been chosen as the primary treatment instead. Also the complication rate for MMS was 8% vs 19% for standard excisions.

Most importantly, patients with recurrent tumours clearly benefit from the 9.8% higher cure rate of MMS.

### **Rationale**

Although tumours excised with positive margins can be re-treated later or monitored for recurrence, it is increasingly difficult to explain to patients why they are being subjected to an extensive repair when their margins are not yet known to be clear of tumour. For these situations, MMS is usually an easier choice of primary treatment, and preferable to a delayed repair following much less accurate standard pathology.

**Tumours that can be easily excised with a sufficiently wide margin to guarantee cure without significantly affecting the repair do not need Mohs. A 'rule of thumb' is as follows:**

- Can I confidently excise the tumour with the recommended clinical margin & repair optimally?
- If not, Mohs (or other margin control) should be considered

Potential indications for Mohs Micrographic Surgery	Implications
Poorly defined clinical margins	High risk of incomplete excision or recurrence.
<p>Tumour close to important anatomical structures or aesthetic boundaries</p> <p>Optimal standard excision margin risks potentially unnecessary damage</p>	<p>Compromising margins risks incomplete excision or recurrence.</p> <p>Using optimal margin risks unacceptable aesthetic or functional impairment, or leads to more complex repair than may be necessary.</p> <p>If primary excision incomplete or tumour recurs, re-excision will be even more difficult, therefore confirmed complete primary excision using Mohs prior to complex repair highly advantageous.</p>
Anatomical location known to be high risk for incomplete excision or recurrence	'H-zone' of face: far higher risk of insidious spread along deep embryonic planes, paths of anatomical least resistance, or perineural tracking.
Recurrent tumour	Has already proved difficult to clear by primary treatment, therefore re-treatment has much poorer chance of success.
Previous incomplete excision	<p>As above, has already proved difficult to clear by primary treatment, therefore re-treatment has much poorer chance of success.</p> <p>However may be satisfactorily re-excised by standard technique if otherwise low risk tumour, and wide margins can easily be taken with little impact.</p>
Gorlin's syndrome, immunosuppression	Patient group high risk for more aggressive tumour behaviour, leading to higher risk of incomplete excision or recurrence.
Large tumour (i.e. 2cm or more)	Subclinical tumour spread more common. Wide margins often needed for cure (e.g. 6mm or more). Mohs technique may allow important sparing of tissue in some directions around tumour, whilst necessarily extending margins in others.
Minimising hospital visits whilst maximising cure rates	<p>In certain situations some of the above considerations can be satisfactorily mitigated by standard excision and delayed repair with standard fixed paraffin histology, or other forms of margin control.</p> <p>However the Mohs frozen section technique allows day case surgery with immediate repair for the vast majority of cases, with the added value of the highest surgical cure rates available.</p>