

SMITH'S FRACTURE



*Marie Antoinette (Kirsten Dunst), Columbia Pictures, 2006*

*So desperate had he become by 1785 that the merest smile or even the slightest nod of recognition from the Queen would have sent him into raptures of ecstasy.*

*De Rohan's well known craving to be accepted at Versailles was exactly the windfall Jeanne La Motte had been looking for. Born into abject and obscure rural penury, she claimed descent from one of the last Valois kings, Henri II, and it was with this tattered pedigree that she too staged fainting fits in the path of Mme Elisabeth, the King's sister, until she got a chance to tell her story of downtrodden gentility. Smitten by her apparent sincerity Mme Elisabeth then set her up modestly at Versailles, from which she proceeded to persuade de Rohan that she was an intimate of the Queen's. Should he do her bidding now and again, there was a fine prospect that he might indeed one day bathe in the radiance of Marie Antoinette's smile. De Rohan rose like a moth to the flame, supplying Jeanne periodically with sums of money that were supposed to go to favored acts of charity, but in fact usually went to her dressmaker.*

Simon Schama, "Citizens", 1989

*Jeanne La Motte very nearly pulled off one of the most sensational "stings" in history. Not merely content with having persuaded the King's sister that she was an impoverished descendant of the Valois King Henri II, leading her to be set up in Versailles, she then looked to the cardinal Louis de Rohan for an even greater prize. De Rohan had fallen out of favour with Marie Antoinette some years before and had effectively been banished from her presence and that of the Royal Court. This was an unbearable slight to the honour of the proud, but somewhat gullible cardinal. It was well known in Royal circles that he would do almost anything to regain the Queen's favour. So desperate had he become by 1785 that the merest smile or even the slightest nod of recognition from the Queen would have sent him into raptures of ecstasy. There was nothing he would not have done to once again bask in the "radiance of Marie Antoinette's smile".*

*In 1785 the court jewelers Bohmer and Bassenge were in a desperate situation. They had spent a King's fortune assembling the greatest diamond necklace in history, a necklace of exquisitely cut South African diamonds of 647 brilliants and 2,800 carats. Only Royalty could afford such a magnificent ornament, and it had been made for Madame du Barry, the mistress of King Louis XV. Unfortunately for Bohmer and Bassenge however Louis had suddenly and unexpectedly died of smallpox, Madame du Barry understandingly suddenly lost favour at court, and they were left with the most expensive diamond necklace in the world, and no buyer. They attempted to sell it to the other Royal families of Europe, but no buyer could be found. The logical next choice was to sell it to the new Queen of Louis XVI, Marie Antoinette. By this time however France was mired in an ever increasing financial abyss and outward shows of Royal extravagance of this degree, although very popular during the time of Louis XV, was now most definitely past its vogue, indeed it was positively frowned upon. Indeed Marie Antoinette's tastes by this time had become far more simple, preferring the simple muslin gowns of the honest "country folk" favoured by the genre of the time as depicted increasingly by portrait artists such as Elisabeth Vigee Le Brun. To Bohmer and Bassenge's utter horror the Queen rejected the necklace. The royal jewelers were ruined.*

*At this moment Jeanne La Motte saw in cardinal de Rohan a possible avenue to untold wealth to match her newfound status of semi-nobility. With her claims of intimacy with the Queen she had the cardinal around her little finger, but it was more than just new*

*dresses she was after. Together with her husband Nicolas La Motte, whom had assumed the rank of comte and added Valois to his name following his marriage to Jeanne, and her lover Retaux de Villette, (there appears to have been some sort of “ménage a trios” arrangement) she plotted to exploit the gullible cardinal de Rohan’s desperate desire to please the Queen. Nicolas La Motte went to the promenade of the Palais Royal, frequented by the ladies of the town and picked out a young professional actress by the name of Nicole Le Guay. What distinguished Nicole was that fact that she bore a striking resemblance to the Queen.*

*La Motte put a proposition to Nicole which surprised her, she thought she was being hired for sexual services, (in the Eighteenth century “actresses” and “prostitutes” appeared to be somewhat interchangeable professions). She was to impersonate the Queen, and would be well payed to do so! She agreed to do it. In one of the most breathtaking “stings” in history, Nicole dressed by Jeanne de la Moite (a courtier acquaintance of Jeanne de La Motte) in the Queens favourite white muslin gown and apparently some type of headdress which partially obscured her face, met cardinal de Rohan at eleven pm at night in the semi darkness in the aptly named Grove of Venus in the gardens of Versailles. There she handed over certain “secret letters” to the palpitating cardinal that requested that he acquire for her inspection the Bohmer diamond necklace, however he had to maintain the upmost discretion, it was imperative that the transaction occurred in absolute secrecy. It happened that Jeanne’s lover Retaux was an excellent forger, it was he who expertly forged the Queen’s hand writing, however he signed it “Marie Antoinette de France”.*

*Ultimately this signature turned out to be a simple but disastrous error on the part of the plotters, royalty always signed documents simply by their baptismal name only, Marie Antoinette, and the “de France” addition was a gross mistake of protocol that anyone of royalty would instantly recognize. After handing over the letters to the cardinal, Nicole then handed him a rose – the flower adopted by the Queen as her symbol, as everyone had seen in Vigee Le Brun’s recent portrait. She then whispered softly into the cardinal’s ear, “you may now hope that the past will be forgotten”, then quickly disappeared into the darkness. The sweaty-palmed cardinal was beside himself and in a hyperventilating rhapsody immediately rushed off to the royal jewelers.*

*The deal was done. Bohmer handed over the necklace for the Queen’s inspection on seeing the “Queen’s” letters, to the cardinal, who in turn handed it on to Jeanne La Motte playing the part of secret courier. Bohmer was then to receive a series of secret payments, the cardinal a substantial commission. Both had sworn to the upmost secrecy. On acquiring the necklace, the comte La Motte had it broken down and fled to England to “fleece” the diamonds at remarkably reduced values. Months went by without any payment to Bohmer, who became increasingly alarmed at the lack of even the slightest communication or acknowledgment from the Queen, who was totally unaware of what had happened until she received a nervous note from Bohmer, whilst not directly asking for the first payment, he hinted that he hoped she was pleased with her new necklace! This note needless to say sparked frenzied royal enquiries, which eventually led to the exposure of the plot and all its players. The cardinal was stripped of all his possessions, as was the forger Retaux, and banished from the court permanently. Jeanne La Motte was stripped, literally, publically flogged and branded with the word “voleuse” (thief),*

*supposedly on her shoulder, but in fact, in her violent attempts to avoid the red-hot brand, it landed on her breast. She was then locked up for life at the hellish Salpetriere prison for women. Nicolas La Motte was sentenced to flogging, loss of all possessions and life in prison, (but remained in hiding in England). Nicole, seen as a poor pawn in the whole affair, was let off with a reprimand for impersonating the sovereign. Although innocent of any wrong doing, it was the Queen, Marie Antoinette however that came off the worst. She had many enemies at court, and the people at large came to despise her, because they wanted to believe she was guilty and did not accept the decision of the courts that she was not. Her reputation had suffered irreparable damage.*

*The world is full of lies and deceptions, all may not be what we are led to believe. It is a message all students of medical exams would do well to keep in mind. A favourite deception of medical examiners is the presentation of a Smith's fracture deliberately disguised as a Colles fracture, (the x-ray is presented upside down to the student, to the sniggering amusement of the said examiners!). In the student's anxiety to please those in authority this trick may understandably be missed. Cardinal de Rohan's punishment though severe by the standards of today, was actually extremely lenient by those of the late Eighteenth century. This was because there was a tacit sympathy for him by many in the court. He may have been gullible, but he wasn't a criminal. Though banished by the court his reputation remained largely intact. And so some comfort perhaps can be taken by the failed medical students in the fact that they have been failed not due to ignorance but due to deliberate deception, their reputations remaining somewhat more intact than that of the examiners!*



*Marie Antoinette (Kirsten Dunst), Columbia Pictures, 2006*

## SMITH'S FRACTURE

### Introduction

A **Smith's fracture** is a **volar** angulated fracture of the distal radial metaphysis.

It is sometimes described as a “reverse Colles fracture”.

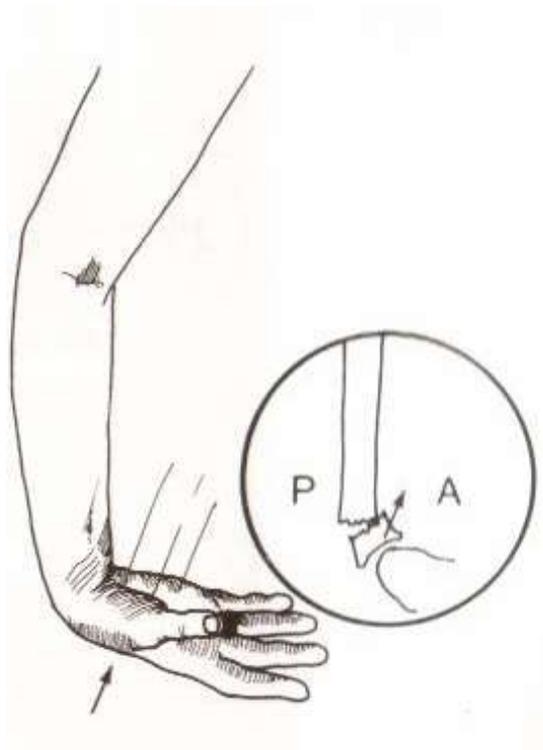
### History

The Smith's fracture was first described by the Irish surgeon, **Robert William Smith** (1807-1873) in 1847. <sup>1</sup>

He worked in Dublin, and interestingly he succeeded Abraham Colles (who named the Colles fracture) as professor of surgery at Trinity college, Dublin.

In France the injury is known as the “Goyrand Fracture” after the prominent French surgeon Jean-Gaspar-Blaise Goyrand (1803 - 1866)

### Mechanism



Smith fractures usually occur in one of two ways:

1. A fall onto a flexed wrist, (as shown above)
2. A direct blow to the back of the wrist

The distal radial fragment is *tilted* anteriorly.

The fragment may also be *displaced* anteriorly.

### Classification

The fracture can be of 3 types:

1. **Type I:**

- **Extra-articular** transverse fracture through the distal radius
- Most common: about 85%

2. **Type II:**

- **Intra-articular** oblique fracture, (conceptually the equivalent to a “reverse Barton” fracture)
- About 13% of cases

3. **Type III:**

- A juxta-articular oblique fracture
- Uncommon: < 2%

### Complications

#### Immediate:

1. Neurovascular compromise:

- This is the most immediate and serious complication, however significant compromise is uncommon.
- Look especially for median nerve compromise.

2. As with any fracture, a compound injury will lead to a high risk for osteomyelitis and soft tissue sepsis.

#### Intermediate:

Union complications as for any fracture, including:

1. Malunion, especially in cases of fracture involving the radiocarpal joint.

Malunion, with residual volar displacement of the distal radius results in a cosmetic deformity referred to as a garden spade deformity.

More importantly it also narrows and distorts the entry to the carpal tunnel and can result in carpal tunnel syndrome.

2. Delayed union
3. Non-Union

#### Late:

Secondary osteoarthritis, especially in cases where initial treatment is suboptimal.

### Clinical Features

#### History

1. Check the mechanism of injury

#### Examination findings

1. Deformity that “classically” has been defined as a “**garden spade**” deformity, (as opposed to the “dinner fork” deformity seen in the typical Colles fracture)
2. Pain, tenderness and swelling over the distal end of the radius.
3. Assess for neurovascular compromise, especially for **median nerve** involvement.

### Investigations

#### Plain Radiology:

In most instances plain films suffice for diagnosis and characterization.

Request:

1. A-P view
2. Lateral view

The fracture line is usually evident, although in **undisplaced or mildly impacted fractures** it can be difficult to see and subtle cortical breaches / buckling should be sought

**Note that this fracture when viewed upside down (as in a mis-positioned x-ray) will look exactly like a Colles fracture**

**The Smith's should be picked however, by noting the position of the (ventrally situated) thumb with respect to the displaced fragment.**

### CT Scan:

In intra-articular fractures (type II) the degree of articular step-off and gap should be assessed, and this may require CT.

### Management

1. As with all trauma, assess and treat any other more immediate life threatening injuries first
2. Analgesia as clinically indicated.
  - Titrated opioids will usually be required.
3. Splint/sling while awaiting radiology.
4. Reduction:

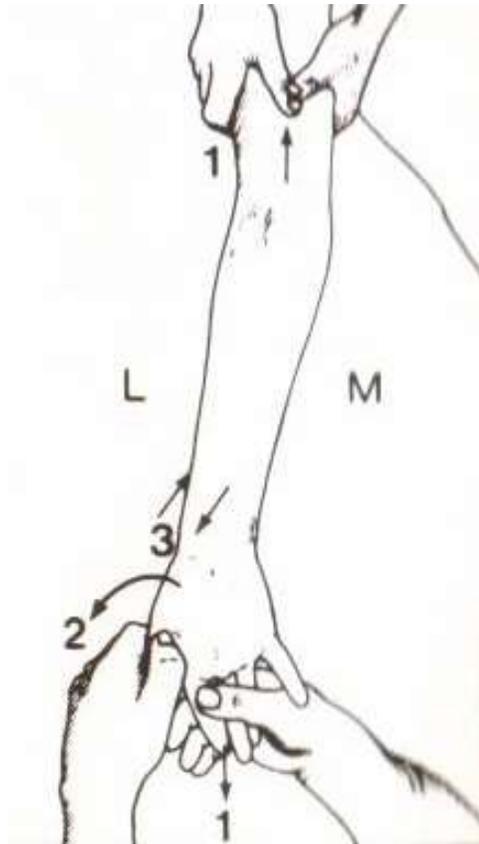
**Note that, as for any fracture, the urgency of reduction will be related to the degree of neurovascular compromise.**

Options include:

- Reduction under Bier's block, in the ED
- Reduction under sedation with ketamine or propofol in the ED
  - More problematic in an unfasted patient.
- ORIF:
  - ♥ In practice many of these fractures are now treated in theater, as they are quite unstable and require meticulous reduction.
  - ♥ **Severely comminuted and unstable fractures will always require ORIF in theater.**

### Reduction technique

1. Traction to achieve disimpaction. An assistant applies counter-traction.
2. Simultaneous supination.
3. Pressure with the heel of the hand over the volar aspect of the wrist to force the distal fragment dorsally.

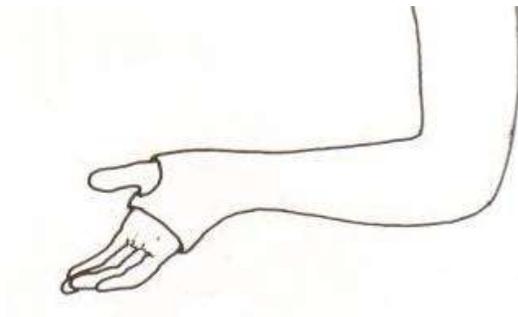


Plaster application:

These fractures are more difficult to keep in reduction than Colles fracture.

An above elbow plaster with the elbow flexed to 90 degrees will therefore be necessary.

Traditionally the arm was immobilized in supination with the wrist in extension (as shown below) - a very uncomfortable position!



**In practice a well molded plaster holding the wrist in the neutral position will usually suffice.**

Disposition:

If reduction is done in the ED, a post reduction film should be done to confirm good position.

Plaster is usually left on for **6 weeks**, and a check x-ray is taken at **10 days**, as displacement is not uncommon.

Admission may be required for some patients, especially the elderly, who may have difficulty coping, for ongoing analgesia and general nursing.

## Appendix 1



*Lateral view of a Type II Smith's fracture, (with soft tissue swelling and ventrally displaced pronator quadratus fat pad). Note that the fracture is displaced towards the thumb, as opposed to away from it, as seen in the case of the Colles fracture and so if the radiograph is inadvertently presented upside down, the fracture is still recognized (as it points towards the thumb)*



*Smith's fracture, type II  
(or "reverse Barton's  
Fracture")  
Case courtesy of Dr  
Alexandra Stanislavsky,  
Radiopaedia.org*



*Left: Eighteenth century depiction of the Bohmer and Bassenge diamond necklace.  
Right: A modern reconstruction displayed at Château de Breteuil, France.*

### References

1. Smith R. W. A Treatise on Fractures in the Vicinity of Joints and on Certain Forms of Accidental and Congenital Dislocations. Dublin, 1847
2. McRae R, Practical Fracture Treatment, 3<sup>rd</sup> ed 1994, p. 181.
3. A.Prof Frank Gaillard et al. Smith's Fracture in Radiopaedia Website,
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Dr J. Hayes  
Dr Peter Papadopoulos.  
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