

## View Point

# Missed scaphoid fracture: Diagnostic difficulty and treatment dilemma.

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### ABSTRACT

Scaphoid is the most common carpal bone to be fractured, accounting for approximately 15% of all wrist fractures. Most important aspect in managing such fractures is the inability to achieve accurate diagnosis, especially when these fractures are un-displaced, minimally displaced, or occult in nature. There is a lack of knowledge regarding such injuries among first responders, especially at primary and secondary care set up of our country. Majority of such injuries are missed in initial evaluation and result in scaphoid non-union, which are difficult to manage and result in functional disability. Detailed physical examination, including, anatomical snuff box tenderness, volar distal tuberosity tenderness, or positive scaphoid compression test (sensitivity 70.5% and specificity 21.8%) along with appropriate radiographic assessment are essential to reach the correct diagnosis and commence the treatment early. The aim of this study is to highlight the challenges and discuss the potential solutions in managing patients with occult scaphoid fractures

**Key Words:** Health workers; Missed fractures; Nonunion; Orthopedic surgeons; Scaphoid fractures.

### INTRODUCTION

Scaphoid is most common among carpal bones in wrist to be fractured.<sup>1</sup> Scaphoid fractures account for approximately 15% of total wrist fractures in young person of age range between 15 to 30 years.<sup>2,3</sup> Classic mechanism of injury is axial loading on an outstretched hand.

Most important aspect is inability to diagnose the scaphoid fracture especially when it is un-displaced, minimally displaced or occult condition.<sup>4</sup> Tenderness on anatomical snuff box, volar distal tuberosity tenderness and scaphoid compression test (sensitivity 70.5% and specificity 21.8%) including proper radiographic assessment (scaphoid series) are essential for diagnosis of scaphoid fractures. Scaphoid series consist of four standard radiographs: a postero-anterior view, a lateral view, a postero-anterior view with the wrist pronated 45 degrees and a similar view supinated 45 degrees.

Because of precarious blood supply, low healing potential and difficulty in diagnosis, scaphoid fractures are more prone to nonunion and up to 32% result in non-union leading to avascular necrosis (AVN), scaphoid nonunion advanced collapse (SNAC) progressive osteoarthritis.<sup>3,5</sup> In order to avoid the nonunion, scaphoid cast should be applied to all patients with clinically suspected scaphoid fractures.<sup>6</sup>

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### EXISTING SCENARIO IN NEPAL

Health-related persons, based on our country setup can be classified into these categories: paramedics or first responders at local clinics, emergency department physicians or medical officers with limited orthopaedic knowledge, young orthopaedic surgeons with limited experience, and experienced orthopaedic surgeons. Clinical setup can also be categorized as: local health clinic without the facilities of quality radiographs, primary or secondary care centres without the availability of experienced orthopaedic surgeons or computed tomography or magnetic resonance imaging facilities, and tertiary referral centres with availability of advanced imaging and experienced orthopaedic surgeons or fellowship trained hand or trauma surgeons etc.

In village area, patients who sustained the wrist injury with suspected scaphoid fractures first visit paramedics at local health clinics to take the opinion. It is almost difficult to visualize the scaphoid fracture by paramedics even after doing the proper view radiograph unless they go to doctors in periphery. It has been assumed that inability to recognize the scaphoid fracture by paramedics is due to lack of orthopedic knowledge. Majority of patients with missed scaphoid fractures who finally visit to tertiary hospital, have once visited to clinic but unable to pick up the fractures. In some cases, scaphoid fractures may be missed by emergency physician with limited orthopedic knowledge who do not have experience to treat this kind of fractures.

In extreme situation, we have experience of seeing the missed scaphoid fractures even previously examined by another orthopedic surgeon. The missed scaphoid fractures are not only the issues of our country, but also the problem

of developed countries as well. That's why research article of large number of scaphoid non-union patients have been published from developed countries. We can definitively say that these numbers are quite high in our country and many cases are unreported. Mani et al<sup>7</sup> from Civil Service Hospital published a research article in International Orthopedics consisting of 50 cases of scaphoid nonunion with around 1200 sample size treated by open reduction, bone grafting and Herbert screw fixation during four years period. Based on this paper, there were 40 scaphoid nonunion patients who were initially treated by paramedics at local clinics, eight were treated by the emergency physicians with limited orthopedic knowledge and two were managed by young orthopedic surgeon with limited experience. This is suggestive of increased number of missed scaphoid fractures resulting into scaphoid non-union in Nepal. Since there are very few articles published in reputed international journals from Nepal regarding the scaphoid nonunion, this article shares our view point in this commonly missed condition.

## HOW MISSED SCAPHOID FRACTURES ARE AVOIDED?

Once scaphoid fracture is missed by primary physician and immediate intervention in the form of either surgery or scaphoid cast is not started, incidence of nonunion is very high. Scaphoid nonunion is very difficult to treat as compared to fresh scaphoid fracture within 2 weeks. Hence there are certain techniques to avoid the missed scaphoid fractures especially at local health clinic where patients first come for treatment.

1. Paramedics at local clinics should always suspect about the scaphoid fractures in case of wrist injury with swelling as a result of fall in outstretched hand. They should always advise the patient to take the opinion from orthopedic surgeon from nearby hospital. We request all health workers not to apply plaster either by themselves or not to let them go home by giving simple analgesic medication rather advise to have opinion from nearby orthopedic surgeon.

2. Medical officers with limited orthopedic knowledge must have knowledge of missed scaphoid fracture. They are requested to do first proper clinical examination like tenderness at anatomical snuff box, tenderness at scaphoid tuberosity on volar aspect and scaphoid compression test before sending the proper scaphoid view radiographs. It is recommended to do the proper scaphoid series radiographs before coming to conclusion. Un-displaced or minimally displaced scaphoid fractures can be managed by themselves if they are living in a remote area, however displaced fractures should be referred to orthopedic surgeons.

3. Many times, patients with scaphoid fractures do not go to doctors because they feel minimal pain and they are able to do daily activities with minimal pain. Hence some kind of public awareness programme may be needed in

society to take immediate advice either from Paramedics or Emergency physicians for simple orthopedic injuries.

4. Most important matter is every Paramedics at local health clinics should think before applying plaster for any orthopedic injuries including scaphoid fractures, are they suitable person to apply the plaster rather than referring the patient to specialist orthopedic doctors.

5. At last Orthopedic surgeons either young or experienced should not miss the scaphoid fractures by doing meticulous examination, even though there are reports of missed scaphoid fractures by experienced orthopedic surgeons also. They should follow all the principle of proper history, clinical examination, appropriate radiographic views, even CT Scan if needed and their personal experience as well before diagnosing and treating scaphoid fractures. Orthopedic surgeons should not hesitate to refer the patients with established scaphoid nonunion which require the meticulous surgery to another colleague who has significant experience of doing these surgeries.

## KEY POINTS FOR MANAGEMENT OF FRACTURES

A common diagnostic and treatment problem in scaphoid injury is it looks fracture on clinical examination; however, radiograph does not show the fracture initially. In case the diagnosis could not be made by all the methods mentioned above, below elbow cast (not necessarily scaphoid cast) should be applied for two weeks. At two weeks, clinical examination and radiograph should be performed to confirm whether there is fracture or not after removing the cast.<sup>8,9</sup>

At two weeks period, bone resorption at fracture site makes fracture visible. Even though Leslie and Dickson<sup>8</sup> has mentioned that fractures not visible on radiograph initially are either incomplete or minors that heal spontaneously regardless of treatment, many other authors have reported that symptomatic treatment in the form of below elbow cast or scaphoid cast is most appropriate in these scenarios.<sup>9,10</sup>

Immediate and precise diagnosis for scaphoid fracture is mandatory specially to initiate the early treatment and avoid the scaphoid nonunion. Based on the systemic review, radiographs indicating normal on suspected scaphoid fractures, will have approximately 21.8% of true fractures.<sup>11</sup> Hence further imaging like Ultrasonography, bone scintigraphy, CT scan and magnetic resonance imaging should be considered in suspected scaphoid fractures with normal radiographs.<sup>12</sup>

## CONCLUSION

Un-displaced, minimally displaced, or occult scaphoid fractures are difficult to identify on radiographs unless performed true scaphoid views and visualized by senior orthopedic surgeons. It seems logical, most importantly, to train or empower the paramedics or first responders at local clinic should be more aware of these kinds of injuries and apply appropriate scaphoid cast for adequate duration. If not possible, they

should refer the patients to orthopedic surgeon in nearby hospital. In addition, medical officers with limited orthopedic knowledge should have some idea whether to refer or treat the scaphoid fractures to avoid the scaphoid nonunion resulting in AVN, SNAC and wrist osteoarthritis. Orthopedic surgeons should perform proper history, appropriate clinical examination, and radiographs to do prompt diagnosis and initiate early treatment.

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