

## Case Series

# Rubber band syndrome, a diagnostic dilemma: case series

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### ABSTRACT

Elastic bands or threads are worn on the wrist, ankle, fingers and sometimes neck, in many religious societies of India as part of their rituals or decorative purpose. It tends to stay hidden in the skin crease. When worn for a long duration, there is gradual, painless penetration of the band through the soft tissue. In neglected cases, re-epithelisation of skin over the buried band occurs. There is subsequent soft tissue infection and features suggestive of compression of the underlying connective tissue. In this article, we present a series of three cases with Rubber Band Syndrome, difficult to diagnose due to forgotten history. They were confirmed to have been suffering from Rubber Band Syndrome only after intra-operative finding of an embedded elastic band in soft tissue during surgical exploration. The buried rubber band was removed and circumferential fibrous tissue were excised followed by physiotherapy and rehabilitation. Aim was to emphasize on need of maintaining a high index of suspicion to diagnose Rubber Band Syndrome in cases, especially in young children, older individuals and people with cognitive impairment, presenting with linear, circumferential scar having compression symptoms. Surgical removal of buried rubber band was successful in all cases. Post-operative follow-up over a mean period of one year have shown a surprisingly good outcome with respect to limb function. A high index of suspicion is required to diagnose Rubber Band Syndrome in cases, especially in young children, older individuals and people with cognitive impairment, presenting with linear, circumferential scar having compression symptoms. It can be treated permanently by a simple surgery of foreign body removal and excision of circumferential fibrous tissue followed by physiotherapy and rehabilitation.

**Keywords:** Rubber band syndrome, Elastic band, circumferential scar, compression symptoms

### INTRODUCTION

Elastic bands or threads are worn on the wrist, ankle in many religious societies and communities in India as part of their rituals or decorative purpose. It can have variable constrictive effects on the limb depending on its mechanical and tensile properties.<sup>1</sup> It tends to stay hidden in the skin crease, especially in infants and young children who tend to have chubby forearms and hands.<sup>2,3</sup> When worn for a long duration, there is gradual, painless penetration of the band through the soft tissue. In neglected cases, re-epithelisation of skin over the buried

band occurs.<sup>2-4</sup> There is compression of the underlying connective tissue, leading to symptoms depending upon the tissue involved and the degree of compression. Two key types of presentation have been observed in the literature acute and chronic.<sup>5</sup> The acute presentation is secondary to a tight, relatively less elastic band which causes compartment syndrome and gangrene. Thus, easily diagnosed.<sup>1,6</sup> The chronic type is due to a relatively more elastic band which burrows gradually over a long duration of time, thus easily forgotten about its presence in neglected cases. Compression of the underlying connective tissue leads to gradual development of distal

oedema, loss of function, infection, neurovascular damage and even bony involvement leading to osteomyelitis and sometimes fracture too.<sup>2,3,7</sup> This presentation has been variously described as “Dhaaga” syndrome, forgotten rubber band syndrome or the elastic band syndrome.<sup>2,3</sup> Although it has been described as rare, many articles have been published in literature regarding this syndrome.<sup>2,3,7-15</sup> The most striking demographic feature of this syndrome is that all cases have been reported from India.<sup>5</sup>

## CASE SERIES

### Case 1

06 years old, girl child with complain of purulent discharge from volar aspect of right wrist of one week duration, insidious onset, associated with intermittent low-grade fever, intermittent dull aching pain in hand which was aggravated on exertion and relieved on rest. Associated with numbness over lateral half of palm. No history of trauma, any surgery involving right forearm. She was managed as a case of abscess over right wrist, with debridement and regular dressing. She was discharged once the wound healed with no purulent discharge. She had recurrence of symptoms after one month. On examination, circumferential scar present over right wrist with small abscess on palmar aspect (Figure 1), reduced sensation over lateral three and a half region of the palm of right hand. Right hand grip strength was weak with incomplete fist formation. Pincer grip was weak. Restricted movements of right wrist joint. She was planned for exploration and proceed under regional anaesthesia with an impression of abscess compressing upon Median nerve. Zigzag incision made over wrist (Figure 2). On dissecting sub-cutaneous layer, glistening white band noticed over flexor tendons and median nerve with constricting effect. Elasticity of the band was present. On close observation, it was an elastic rubber band (Figure 3). Further investigation revealed that the mother had the habit of applying a rubber band on the wrist after removal from hair, to be used again. Approximately 03 months, back she forgot to remove it from the child’s wrist. On attending a religious ceremony, some religious thread was applied over the rubber band on right wrist, as part of ritual. Thus, forgotten! Post-operatively she received a short course of antibiotics, analgesics and regular dressing. She was discharged POD 03. After physiotherapy and rehabilitation, she recovered completely in 03 months.

### Case 2

02.5 years old, girl child presented with a two-month history of erythema and circumferential swelling about her left ankle, insidious onset, gradually progressive to cause swelling of the entire hand. Associated with occasional discharge. Her parents reported that two weeks prior to presentation to our facility, they had removed a religious bracelet that seemed to be tight

around her ankle. The patient received both IV and oral antibiotics along with other supportive medications, but had no significant improvement.



**Figure 1: Circumferential scar over right wrist.**

On examination, mildly tender circumferential erythematous swelling noted in left ankle. Generalised swelling of dorsum of foot and fusiform swelling of digits. A small 05X05mm area along the dorsal aspect of the swelling drained purulent discharge. No skin colour changes noted. No neurovascular deficit noted. Range of movements were normal.



**Figure 2: Zigzag incision made.**



**Figure 3: Rubber band noted compressing upon underlying tissue.**

Cultures obtained prior to consultation were all negative. Elevated white blood cells count. Patient was taken to the operating room for surgical exploration under anaesthesia. The dorsal opening was extended. Blunt dissection was carried out, draining pus all along till a rubber band was identified on dissecting sub-cutaneous tissue. The band was cut and traction applied to one end. It slid out in continuity. This band was a remnant of the bracelet that the parents had removed from the child's ankle earlier. The wound was irrigated, thoroughly washed followed by regular dressings, antibiotics and analgesics. She was discharged on POD-05. She had no recurrence.

### Case 3

68 years old, male, presented with swelling along the left wrist of one week duration, insidious onset, gradually progressive. Associated with tingling, numbness and difficulty in performing movements of left hand. No history of any trauma or surgery in that region. Initially started on oral antibiotics and supportive medication in view of soft tissue infection. No significant relief noted. On examination, mildly tender circumferential scar noted on left wrist crease, small 03X03mm ulcer on palmar aspect, skin was indurated. Generalised swelling of left wrist. No redness or warmth noted. Hypoesthesia of whole hand noted. Restricted flexion of wrist joint. Fist formation was incomplete. Grip strength was weak. Pincer grip was weak. Phalen's test was positive. Surgical exploration was planned under anaesthesia. A vertical Zigzag incision was made over the palmar aspect of left wrist. A rubber band was found embedded just superficial to Palmar Longus tendon. The rubber band was removed, flexor tendolysis and median nerve neurolysis done. The patient had no recollection of wearing the band. Physiotherapy was initiated on POD-01. The patient was assessed for cognitive impairment and diagnosed to have mild Dementia. The skin ulcer epithelialized in three weeks. Pain and swelling subsided completely within one year. Hand grip improved significantly.

### DISCUSSION

In India, there is a tradition of tying a rubber band or a string around the wrist for religious ceremonies and decorative purpose. Rakesh et al 5 conducted a systematic review of literature for all articles reporting a chronic type of rubber band syndrome and found 15 cases reported in children less than six years, mean age was 2.9 years, all of which were from India. In this case series, two cases (case 01 and 02) reported are children below approximately 06 years of age, who have chubby forearm and hand where the band tends to stay hidden, thus forgotten.<sup>2,3</sup> The cause in both cases were of a religious background. The third case is that of 68 years old, belonging to an age group where wrinkled skin and age-related cognitive impairment is commonly seen, thus forgotten. The patient had no recollection of wearing the band. Young children, older individuals and people with

cognitive disability do not understand the risk of having a rubber band in place, they have difficulty communicating, or they are unclear on the process of injury that could occur because of problems with memory.<sup>16</sup>

A high index of suspicion is required to diagnose Rubber Band Syndrome in cases, especially in young children, older individuals and people with cognitive impairment, presenting with linear, circumferential scar having compression symptoms. It may easily be misdiagnosed as a case of hypertrophic scar and managed accordingly with reconstructive procedures, but to no favourable outcome. Association with chronic discharging sinus may lead to a diagnosis of tuberculosis (endemic in India).<sup>2,3</sup> The patient will keep having recurrence of symptoms and be exposed to multiple interventions, with no relief. Affecting the hand, it will lead to inability to perform day-to-day activities and loss of skills. Thus, affecting the patient mentally, physically and socially. In this case series, case 01 initially underwent debridement, regular dressings and discharged, only to come back with recurrence after a month. Rakesh et al 5 concluded that the rate of misdiagnosis was 46.7%, seven cases were noted – three were put on anti-tubercular chemotherapy, one on steroid injections, and three on antibiotics and/or analgesics. This can be easily avoided, if diagnosed early with detailed history taking and proper clinical examination.

In this case series, the presence of a buried rubber band was confirmed only intra-operatively, no pre-operative imaging was conducted. Plain radiographic finding of soft tissue constriction sign is pathognomic.<sup>2-4</sup> A Arora et al 2 noticed plain radiograph finding of circumferential constriction in the soft tissue, in all three cases reported. MRI scan and Ultrasonography can be used to supplement radiographic findings, but not always necessary.<sup>7,10</sup> Agarwal et al 7 used MRI scan to confirm the presence of the buried rubber band in their report. Gupta et al 10 used USG scan to confirm the diagnosis. Soft tissue constriction sign described first by Aggarwal et al 3 in 2010 was noted in 78.57% of the cases. Surgical removal of buried rubber band was successful in all cases reported in this series. Subsequent physiotherapy, antibiotics, analgesics and rehabilitation produced speedy recovery. Post-operative follow-up over a mean period of one year have shown a surprisingly good outcome with respect to limb function. Rakesh et al 5 concluded that prompt surgical exploration and foreign body removal along with excision of circumferential fibrous tissue leads to a speedy recovery and good outcome in all cases, except for three cases out of 15 who had neurovascular involvement, none required reconstruction.

### CONCLUSION

The presence of a linear, circumferential scar with chronic discharging sinus especially in young children, older individuals and people with cognitive impairment

should raise suspicion of a possible Rubber Band Syndrome, due to some form of elastic band being worn for religious or decorative purpose and neglected. A plain radiograph, Ultrasonography and MRI scan indicating soft tissue constricting band can be used to confirm diagnosis. Prompt surgical exploration and foreign body removal along with excision of circumferential fibrous tissue leads to good outcome in all cases.

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