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3 **Fodder cutter (Tokka) injuries; a preventable morbidity**

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10 **Abstract**

11 Pakistan is an agricultural country where fodder cutter (Tokka) is a commonly
12 used machine on the farms. While using it, farmers often meet with accidents
13 causing injuries which are disastrous, and mainly involve the young generation
14 often causing lifelong disability.

15 This is a hospital-based case series, conducted from June 2018 to January 2019 in
16 the Department of Surgery, Lahore General Hospital, Lahore. For this study the
17 patient's demographic data, site of injury, procedure performed and
18 post-operative outcome were recorded.

19 The study includes a total of 30 cases of tokka injury, (23 males and 07 females)
20 with median age of 25 years. Most commonly injured part of the body was the
21 upper limb, in 26 patients, while the lower limb was involved in 2 patients. There
22 were 18 amputations, 8 stumps formation and 4 debridements. Out of the 18, 9
23 had to be amputated at the wrist, and 9 amputations were performed higher than
24 the wrist. Post-op recovery was uneventful in all cases.

25 Measures such as safer machine design and education of farmers about the safety

26 procedures can significantly avoid these tragedies.

27 **Keywords:** Chaff cutter, Agricultural injuries, Amputations, Farm injuries

28

29 **Introduction**

30 Agricultural injuries are common amongst occupation-related injuries and are a
31 serious risk to the health of the rural public.⁽¹⁾ The severity and violence with
32 which these injuries occur reflect the occupational dangers of the agricultural
33 industry. The risk of fatality associated with farming is more than five times
34 higher than the aggregate rate for all other occupations.⁽²⁾ Internationally, data
35 about the prevalence of agricultural injuries/amputations is sparse even in
36 developed countries where 30-50% of the total population is related to farming.⁽³⁾
37 Epidemiological studies are the need of time to project the seriousness of these
38 injuries in agriculture workers.⁽⁴⁾

39 Pakistan is an agricultural country, and Lahore is famous for its fertile lands. In
40 Pakistan, 44% of the labour belongs to the farming sector.

41 Fodder cutter (tokka machine), Chaff cutter and chopping chest are different
42 names of the device used by farmers to chop straw, hay and corn fodder into
43 small pieces that the livestock can easily digest.⁽⁵⁾ Initially, it was available in a
44 standard hand driven form which was safer but more time and labour was
45 required to get the desired result. Now fodder cutters have evolved from the
46 primary machines into commercial standard motor driven tools.⁽⁶⁾

47 People of all age groups and genders are involved in these activities, and the
48 resulting morbidity is very high and alarming. These injuries mostly involve the
49 upper extremity, causing devastating lifelong disability among young population
50 and result in a lot of social, cultural, and monetary loss.⁽⁷⁾

51 Quite a large number of patients with fodder cutter (Tokka) injuries present at the
52 hospital. Hence, it is immense need of time to conduct a study to highlight this
53 critical issue for the prevention of disability resulting from these injuries and to
54 promote the safety protocol while working with these machines.

55

56 **Case Series**

57 This case series was conducted in the emergency department of Lahore General
58 Hospital, from June 2018 to January 2019. All the patients with an injury
59 secondary to fodder cutter (tokka) machine were included in this study (figure 1).
60 All other farm-related machine injuries were excluded from the study. All the
61 patients were received in the emergency department. Resuscitation of all the
62 patients was done with standard protocol. Wounds were immediately treated with
63 a compression dressing. Laboratory investigations such as blood complete
64 examination and blood grouping were done. Radiological studies of the injured
65 area and wherever needed were carried out. Blood transfusion was given
66 wherever required. Antibiotics were started on an empirical basis, and tetanus
67 prophylaxis was administered. Patients received surgical treatment depending on
68 their injury in the form of debridement or stump formation. Patients were
69 admitted to the indoor facility. Later, these patients were discharged and followed
70 up in the OPD.

71 Demographic data regarding age, sex, side, level of injury, type of treatment
72 given, and type of fodder cutter machine used was recorded in the Performa. All
73 the data was analysed in SPSSv20.

74 A total of 30 patients were included in this series for the six-month period. There
75 were 23 males and 7 females. Male to female ratio was 3:1. The median age was
76 25 years (IQR 12-60). Age ranged from 9 years to 70 years.

77 These injuries involved different parts of the body. Most commonly affected part
78 was the upper limb in 26 patients. The lower limb was involved in 2 patients,
79 while there was one case each for head & neck and genitals (chart 1).

80 Amongst the upper arm injuries, right upper arm was involved in 16 patients and
81 left upper arm was involved in 10 patients. The most commonly involved site was
82 the wrist (9), followed by digits (8), forearm (below the elbow) (7) and arm (2)
83 (chart 1).

84 Both the lower limb patients were males and had degloving injuries at the ankles.
85 One female patient had scalp avulsion and damage to the right ear. One patient
86 had a degloving injury to buttock without any bone involvement.

87 None of the patients received replantation due to late presentation, multilevel
88 injuries, an element of the avulsion, crushing and unavailability of the amputated
89 part. There were 18 amputations, 8 stumps formation, 4 debridements (chart 2).
90 Chart 2 also describes all the different types of amputations performed in the
91 patients. All the patients were sent for rehabilitation after amputation and stump
92 formation.

93

94 **Discussion**

95 The agricultural industry has been modernised by the introduction of new motor
96 machines. But they are not risk-free and cause preventable severe injuries and
97 even deaths. Pakistan being a rich agricultural country is at an immense risk of
98 agricultural farm injuries.

99 Tokka machine is amongst the commonly used tools in the farms; hence, injuries
100 related to them are quite common and devastating. Tokka is often referred to as
101 “Snake of the Sleeve” or Double-Sided Sword.

102 Agricultural injuries are highly gender specific with 90 to 97% of these injuries
103 occurring in males.⁽⁶⁾ Results of our study follow the same pattern, as there were
104 23 males (76.6%). However, females were not immune to farm injuries. Children
105 are also at risk as most of them go with their parents for fun and are left
106 unattended when parents get busy in work.

107 In agriculture-related injuries, trauma to hand and upper extremity is common,
108 representing from 40% to 70% of total accidents that occur on a farmyard.⁽⁸⁾ In
109 our study also, the upper limb was involved in 26 patients (86.6%), out of which
110 the most commonly involved site was the wrist (9 cases), followed by digits (8
111 cases), forearm (below elbow) 7, and arm 2 cases. Other less commonly involved
112 parts were lower limb, head & neck, and genitals.

113 Amputations were the most frequent procedure to be offered, because the
114 mechanism by which most agricultural equipment causes injury is a combination
115 of compression, shear, and thermal components along with contamination, hence
116 causing variety of traumatic de-gloving injuries or complete amputations of
117 either fingers or hands.⁽⁹⁾

118 While keeping in mind the magnitude of these devastating injuries, one can well
119 conclude that prevention is the only solution to offer. An ounce of prevention is
120 better than a pound of cure. Although we have adopted modern Western
121 machines, unfortunately, most of our farm workers are reluctant to practice safety
122 measures due to ignorance or absolute neglect.⁽¹⁰⁾ Most of the agricultural
123 machines have pulleys, gears and rotating shafts which can easily entangle loose
124 clothes, especially like dhoti ad kurta in males and dupatta in females.

125 Unfortunately, farming has not been taken as industry and is being neglected both
126 at the government and social levels. We strongly recommend that in the
127 manufacturing of these machines, safety should be the top priority. While

128 manufacturing, simple measures such as reducing the exposure of pinch &
129 cutting part of the device with the help of safeguards & shields, disengaging gear,
130 emergency brake, flash sensor, and automatic switching should be assured. Laws
131 should be formulated and implemented for the manufacturing of safer tokka
132 machines. Formers should be educated regarding machines and their safety
133 manuals. Awareness campaigns with the help of media at the national level
134 should be promoted.

135 People should be educated to immediately reach an appropriate healthcare
136 facility in shortest possible time, and medical & paramedic staff in the periphery
137 should be trained in handling and transporting amputated limbs while transferring
138 the patient to specialised centres.

139

140 **Conclusion**

141 Tokka injury is a severe and constant endangerment to the farm workers,
142 especially the young male population. Prevention is the only solution to this
143 horrendous morbidity. Measures such as safer machine design and education of
144 farmers regarding the safety measures can significantly reduce these tragedies. It
145 is immense need of time to highlight this critical issue at local as well as national
146 level to educate the public at large to adopt the safety protocol while working
147 with tokka machines.

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150 gave consent regarding its publication.

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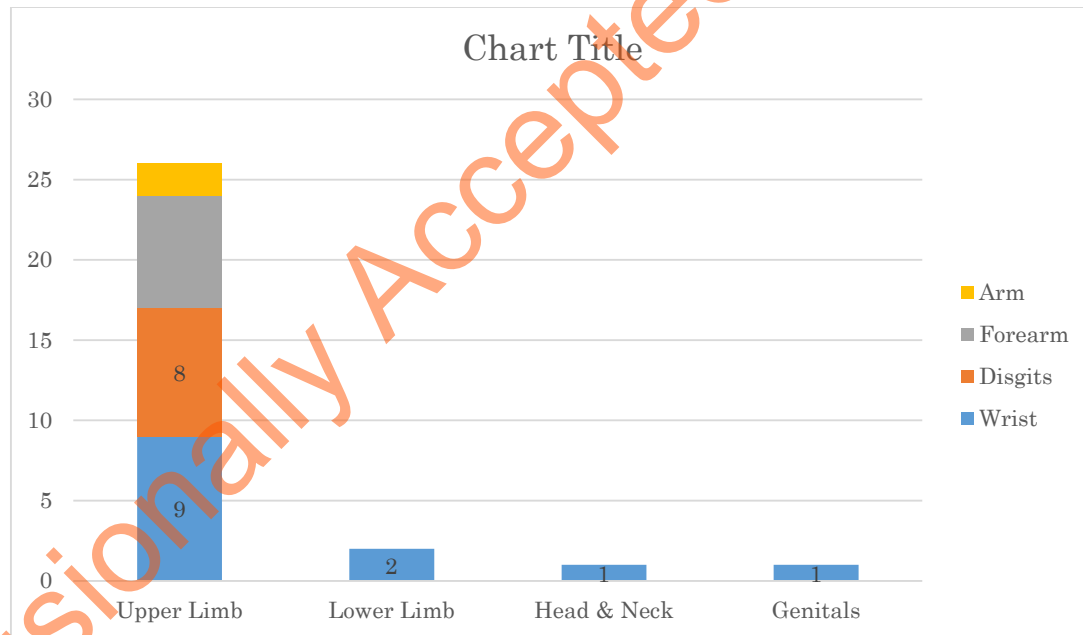
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Charts



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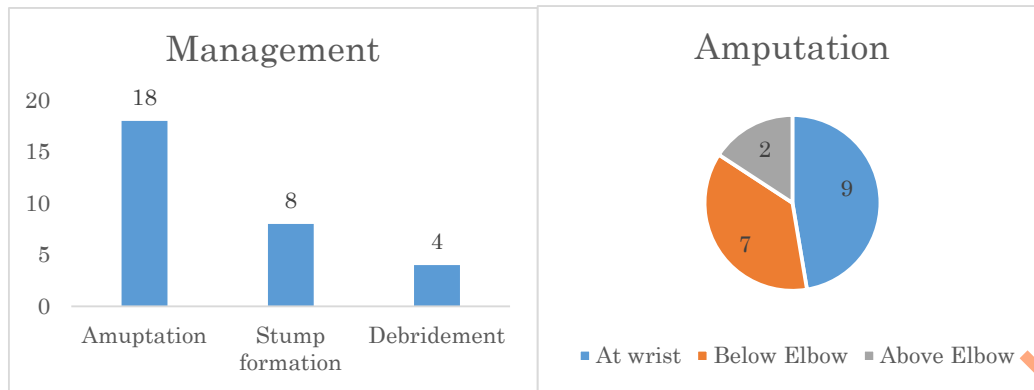
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Chart 1: Distribution of the injuries according to the regions of the body.



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198 **Chart 2: Details of the procedures performed in these patients.**

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203 **Fig 1: Patient with amputation of fingers of left hand by tokka.**

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