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## Kite string or manza injuries during Makar Sankranti festival (Uttarayan): Our experience

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### Abstract

**Background:** Kite thread injuries specially due to chinese Manza is one of the major cause of an emergency in the casualty of NKPSIMS, Nagpur., India. Neck, face, legs, hands are the typically most affected sites as most of the patients are travelling on a speedy two wheeler, eyes cannot see manza thread of kite.

**Methods:** We have studied 30 cases of manza cut injury presenting to a tertiary care centre at Nagpur during last few years. All the patients had varying degrees of injuries which were managed in our hospital were no mortality amongst these cases.

**Result:** A total 30 cases were identified. Males are most commonly affected. The most common age group affected was 16 to 30 years. Hand, neck and face are most commonly involved. There were no cases of mortality.

**Conclusion:** Kite flying is very enjoying game, famous in Gujrat, Maharashtra since years, but introduction of chinese or nylon manza in kite flying causing grievous injury even death, not only to flyer but also to the innocent other people, animals and birds. This study attempts to enlighten the side effects of chinese manza and necessity to ban it legally in kite flying.

**Keywords:** kite string, chinese manza, nylon manza, makar sankranti, uttarayan, slit neck, trachial injury, neck vessel injury, profuse bleeding

### Introduction

A kite is a frame of wooden sticks light in weight covered with a thin paper coloured or designed and joined with a long string that is flown in the air called kite flying. Kite flying activity is a common activity in many countries particularly in Indian subcontinent and in South America. The nature and forms of kite flying however vary Region to region. Makar Sankranti is the day when the glorious sun god begins its ascendancy and entry into the Northern hemisphere. (Sanskrit - uttarayan).

In the Western part of India specially Gujrat, Maharashtra and Rajasthan, this festival is traditionally celebrated by flying kites<sup>[1-5]</sup>.

During season of Uttarayan a total 30 cases were presented to our hospital with some or other kind of string injuries. A majority of them suffered injuries on 14 th and 15 th of January, as majority people do kite flying on and around 14 th January, Makar Sankranti, and few of them on 15th January., 15th January is the day following Makar Sankranti called Vasi Uttarayan.,

Initially kite flying was a hobby but over time children and adults started kite flying competition with an objective of bringing down kite of their competitors. Fierce competition has led to players using more dangerous kite strings which gives them edge. As a-result, incidence of injuries resulting from kite string are on the rise. Flyers and passers-by especially in the populated areas both were getting injured. We retrospectively reviewed a series of patients who presented with kite string injuries at NKPSIMS. The result of the study and a brief review of the existing literature are presented in this article. This study highlights what are the common injuries during this seasons of kite flying, and Chinese Manza as a major cause.

### Essential anatomy of the neck

Neck is broadly divided into zones, the system usually used in the evaluation and treatment of penetrating neck injuries.

Zone 1. From the clavicle to the cricoid cartilage including thoracic inlet. This region containing Major vascular structures of the subclavian artery and veins, jugular veins, common carotid artery, esophagus, thyroid, trachea.

Zone 2. Extending from cricoid to angle of mandible. Contents - common carotid artery, internal and external carotid artery, jugular veins, larynx, hypopharynx, cranial nerves X, XII,

Zone 3. Area extending from angle of mandible to skull base [5].

Injuries due to kite flying are two types - direct and indirect. Direct injuries are slitting injuries due to thin strings. This is very common during Makar Sankranti in Maharashtra, Gujrat and Rajasthan. Almost all our patients were on some kind of fast moving open vehicle usually two wheelers. Non use of head and neck protection eg. Helmets, neck scarfs, was a common occurrence in all patients. These injuries usually result when a person moving in a two wheelers suddenly comes in contact with a kite string of a flying kite which is close to the ground. These strings comes in contact with the skin of neck, face, he tries to remove string with hands, so his hands like thumb, index fingers gets affected with tendon injuries of thumb and index finger. Persons those wearing helmets strings slips to neck and cause slitting of neck. Persons not wearing helmets then it causes cutting, slitting of nose, bilateral angles of mouth, upper eyelids, sometimes in legs, tendo achilles and front of ankle joint were cut in our study. As a moving two wheeler taken sametime to decelerate and stop the relative motion between the string and skin causes trauma to person. The amount of kinetic energy delivered by the wounding agent has to be considered together with its interaction with the involved tissue. The wounding capacity of the string is hence proportional the speed of the persons two wheeler. Thinness, sharpness and strength of the threads aggravates the injury. These threads are usually multibraided and coated with fine powdered glass (manza), which adds to their incisive property. Nowadays Chinese manza or nylon manza is deadly weapon as it does not

breaks and so it can cut throat, larynx, pharynx, trachea and vessels. The extreme thinness and there light colour reduces their visibility even in abroad day light. It is usually a free flying kite string or a kati patang- whose thread is cut and is lying low near the ground and it causes maximum damage as it is usually pulled by other kite flyers. A slow moving person came in contact with manza will get superficial cut or abrasions, but fast moving persons may get injured - extensive vascular, laryngeal injuries and may be life threatening, if not treated early. Zone I and II are / were the affected sites in our study, in patients with neck injuries.

### Methods

Medical records were retrospectively reviewed of patients with injuries due to kite strings who presented to the emergency department of NKP Salve institute during Jan 2017, Jan 2018 and Jan 2019. With direct injuries means those inflicted directly due to contact with kite string with any part of body.

Indirect injuries i.e. those inflicted indirectly, due to fall from rooftop or fall from running vehicle were not included in our study. All patients were divided into two categories group 1. Who were injured during kite flying and are involved in flying. Group 2. Other were by passers who are victim of kite string injuries [6].

This study was conducted in the department of plastic and reconstructive surgery NKPSIMS Nagpur.

### Results

A total 30 cases were presented to the emergency department of NKPSIMS during month of Jan 2017, Jan 2018, and Jan 2019. These patients presented with injuries directly related to kite strings.

Majority of patients. Fall into group II, male to females ratio, Patients aged 12 to 45 years form the majority of patients.

**Table 1:** Group II cases

Sr. No.	Injury on body part	Age	Male	Total	Total cases
1.	Neck				
	Superficial (upto platysma)	14 yrs to 40 yrs	3	2	5
	Deep(Deep to platysma)	25 to 35 yrs	7	2	9
2.	Eyelid injuries	20 to 30 yrs	1	3	4
3.	Nose injuries	35 to 45 yrs	2	1	3
4.	Upper lip and angle of mouth injuries	18 to 35	1	1	2
5.	Hand injuries				
	Thumb	35 to 45 yrs	3	0	3
	Finger	8 yrs to 55yrs	1	1	2
6.	Lower limbs				
	Legs				
	Tendo achillies injuries	20 to 45 yrs	2	0	2
Total		8 to 45 yrs	20	10	30

There were total 30 cases in our study. Injuries in group 2 were more than group 1. Male to female ratio was 2:1, Majority cases were due to neck and hand injuries. Group 2>grp 1= 27:3.

### Discussion of results

We studied all these cases presented to us one day previous and a week post 14th January. All these cases presented to casualty department. All patients were assessed for the requirement of emergency resuscitation, airway compromise, active bleeding, and depth of injury. Active bleeding is controlled in emergency department by ligating bigger veins or vessels and after pressure bandaging. Patients are immediately shifted to operation theatre.

Airway management cases sometimes be challenging. Hoarsenes, stridor, respiratory distress, hemoptysis, hemodynamic stability and subcutaneous emphysema all suggests injury to airway and or vasculature. A quick surgical and orthopedic opinion was also taken to rule out neurological or abdominithoracic or any bony injuris as most of these patients had a history of fall at the site of injury.

None of our patients needed any urgent airway management and neither did they have significant asociated neurological or abdominothoracic or orthopedic injury before shifting them to the operation theatre. Except one Patient developed electric burn injury to the hand while removing kite hanging on electrical

pole, All trauma patients underwent preliminary laboratory Tests like hemoglobin, glucose levels, and electrolytes levels. After achieving good airway, good breathing and circulation, most patients were shifted to plastic surgery operation theatre for exploration of neck wounds or hand injuries with cut tendons or neurovascular bundles of fingers or thumb. Preparation of surgery also included tetanus prophylaxis, broad spectrum antibiotic prophylaxis and collecting blood specimen for typing and cross matching if blood transfusion is required. Cooperative adult patients and patients with superficial injuries - skin, subcutaneous tissues and strap injury were explored under local anaesthesia. Majority of our patient in this series we have explored under local anaesthesia except one patient of neck injury, where injury was deep slightly cutting trachea partially but airway was not exposed, he was explored under general anaesthesia not a single patient got complete tracheal injury. Two patients required blood transfusion due to profuse bleeding due to cutting of neck vessels which were mostly veins and small arteries and are ligated. Two patients with lip injuries and 3 patients with nose injuries were sutured in 3 layers, under local anaesthesia. 3 patients having thumb injury of which 2 patients had FPL cut injury repaired under brachial block. 2 patients having index and little finger tendon injury repaired under brachial block and tendon and neurovascular bundles repaired under microscope. 2 patients with angle of mouth injuries was repaired under local anaesthesia with 6.0 ethilon cutting needle and 5.0 vicryl cutting needle. 4 patients with eyelid injuries were repaired with 6.0 ethilon and 6.0 vicryl cutting needle under local anaesthesia. Two cases came with tendoachillies tendon cut injury due to chinese manjha were repaired under spinal anaesthesia, while walking manza was entangled in legs and his posterior aspect of ankles cut causing injury to Tendo achilles. In case of neck injuries profuse bleeding was found to be cut injury to anterior jugular veins found in 9 cases out of 14 cases of neck injury, where bleeding veins ligated. In few branches of external carotid were bleeding. All the bleeding or ruptured veins were safely ligated. If internal jugular veins cut accidentally it should be repaired immediately with vascular 7.0 proline. All the muscles with strap muscles trauma were explored for any inadvertent injury to the deeper vessels. Hematomas washed with normal saline and sucked out. Hemostasis achieved with bipolar cautery and 3.0 vicryl sutures. Thorough saline wash given, Non of our patients got laryngeal injuries. Non of our patients developed cricothyroid membrane injuris or cervical spine injury. Non of our patient got esophageal or deeper injuries.

Clean dressings, completion of medico legal formalities, (MLC) and patients willingness to come for follow up checkups and dressings and suture removal, on this basis we have made criteria to plan discharge of patients, suture removal, we have done approximately 8th day post operatively. 2 patients developed serous discharge, one patient shown slight breakdown of wound on one side managed with dressings and secondary suturing. We have kept minivac drain no 8 in most of wounds and drain was removed after 48 hours.



**Case 1:** Pre-operative and post-operative view. Fig 1 and 2, because of profuse bleeding we have to operate patient in ICU bed only, because patient was in shock.





**Case 2:** Preoperative and post-operative view. Neck injury.



**Case 5:** Nose injury pre op. fig. 7. And post op fig. 8.



**Case 3:** Thumb injury preoperative view.



**Case 4:** Tendoachhiles tendon injury.

### Discussion

Kites are believed to be invented in China and spread to different parts of the world. In India, kite flying is a popular activity in January around the Hindu festival of Makar Sankranti, when the sky was studded with thousands of kites, groups of people engage in a fiercely competition, using their own string as a weapon to cut and bring down-other kites [1, 2, 4, 5, 6]. Competitors uses various means to make their strings sharper and stronger. Such kite strings are called Manza, they are cotton or nylon-strings coated with crushed glasses using glue and other chemical adhesives. Chinese Manza is usually nylon manza is very dangerous. As it does not break easily and slit throat or hands like a sharp knife. A study of pediatric age group

in northern India found that males 5 to 10 years of age were most susceptible whereas another study from western India showed that males 16 to 45 years were most frequently involved. In our study males with age 8 years to 35 years were involved.

Injuries in our study ranges from abrasions to full thickness lacerations involving deeper structures. Kite flyers and handlers are prone to injuries over their hands and face. They also face dangers of accidentally falling from the roof tops-and suffer further injuries. Uninvolved passer by, motorist or riders form the second group who are injured by string kites. That drift onto the road or strings that are caught and hanging from trees or electric wires. These strings can injure the face or entangle around their neck, the severity, the depth and pattern of which depends upon the relative Speed of movement. Electrocution injuries due to fall from rooftop on electric wires hanging outside buildings is also common. These burns may turn fatal, may be associated with head injury. Similar pattern of injury are seen in this study. A very high proportion of injuries involved

The head and neck. It is very true that majority patients fell into the group II, who were passively injured. These indirect or secondary injuries are equally responsible for morbidity related to kite string injuries. The present study focuses only on direct injury and hence indirect injuries were not included in our study. The exact incidence of kite flying injuries is difficult to compile, probably because a number of non life threatening injuries tends to be managed at primary medical centres and largely go unreported. Cases that are immediately fatal are also fail to reach a tertiary centre.

Laws could be crafted to allow for safe kite flying, keeping in mind public sentiment and enthusiasm. Hence regulation and education, rather than prohibition is suggested. Depending upon the geographical region, incidence of kite flying spikes during a certain event or month or time of the year. This time period is predictable and thus prevention can be focussed on, rather than banning it.

Kite flying can cause interference in flight operations - which is potential hazard. Injuries to birds and other animals like Dogs is happening routinely so kite flying demands caution and responsible actions on the part of people-and the local government authorities<sup>[6]</sup>.

Prevention should be advocated by Pamphlets and information booklets, television, facebook - whatsapp media can be used for this, various mobile applications (apps) can be used for spreading this message. Various videos, animations can be shown on TV, news, youtubes and facebook so that children and adults of all ages can understand this message. Wearing gloves and head gears, covering exposed extremities should encouraged for kite flyers. We should use local government authorities to organize formal kite flying and discourage kite competition. Avoid or ban kite flying from rooftops and designate open spaces for kite flying. Such spaces should be away from roads, power lines or grids, airport, bird sanctuaries. Medical. Facilities for immediate care (first aid) and transport should be made available during such event.

Chinese manza or nylon manza should be banned. National green tribunal principal bench<sup>[14]</sup>. New Delhi, after application by people for the Ethical treatment of animals (PETA) India to ban Chinese manza taken an action. Under the provision of Environmental protection act 1986, prevention of cruelty act 1960, the wildlife protection act 1972. The Indian penal code and any other law provision to prohibit manufacturer, use, sale and purchase of any kind of synthetic, nylon threads used for kite flying and to strictly enforce prohibition throughout the state and union territories as this is in public interest and has national

importance.

Nylon synthetic manjha is made of monofilament fishing line. It is made up of single plastic fibre and is glass coated, which makes it deadly. Monofilament is made by melting and mixing polymers which extruded through tiny holes and then spun into spools of various thickness. Monofilament are non biodegradable and they are very thin in nature and so birds and animals also humans

Cannot see it easily, they can easily get brushed against manjha and entangled into it. These causes risks to swimmers and scuba divers. This is a microplastic which may cause starvation or poisoning of organisms in soil and water. Chinese manjha causes cutting of skin of animals, human and birds. Kite flying is a recreational activity and it does not require utilization of harmful strings like synthetic or coated with sharp material manjha for flying kites. Use of plain cotton thread is better suited for this purpose as it is incapable of causing injuries to human beings.

During kite flying activity, 100s and 1000s of meters of manjha thread is used by the people. After kite flying much of the thread is discarded and improperly disposed by its users. The threads discarded are scattered on the ground, down the drain, water channels etc. This thread is non biodegradable. So causes clogging of water based systems apart from polluting it and even cutting electric lines and power cables, so on. So on 14 dec 2016, judge from National green tribunal<sup>[14]</sup> bench New Delhi, issued notice that due to protection needs to be given to wildlife as well as environment besides resultant injuries, deaths of human beings. Accordingly directions were issued- "that the entire country, there shall be prohibition on procuring, stocking, sale and use of nylon thread. Which is also called Chinese Manjha or Chinese dor, and other synthetic thread coated with glass and such other harmful substances for kite flying. However, it was made clear that cotton thread, other than aforesaid thread could be used for kite flying, but such threads which is glass coated or coated with other harmful material will not be permitted to be used for the same.

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