

# A boxer with a solitary normal kidney-to fight or not to fight?

## Abstract

Boxing is included under the category of combat/contact sports. Shots to the head leading to head impact exposures are common and hence professional boxing is associated with a high risk of both acute and chronic neurological injuries. These injuries have been well described in medical literature. In boxing shots to the body (body shots) are also common. These shots can lead to injuries to solid organs such as the liver, spleen and kidneys. In this case report a boxer with a solitary normal kidney is presented. Should this boxer be denied licensure to partake in boxing or that clinical judgment be exercised on a case-by-case with respect to medical fitness to fight?

**Keywords:** boxing, combat sports, kidney, renal injuries

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## Introduction

Boxing is a combat sport in which damage to intra-abdominal solid organs such as liver, spleen and kidneys is a possibility. Due to the paucity of medical literature, it is unclear whether professional boxers with a solitary normal kidney should be allowed to fight.

## Case report

A-23-year-old male boxer applied for his professional boxing license. As part of the medical requirements for licensure, an intake medical history form was completed. The boxer documented that he had a solitary normal kidney having donated one kidney to a biological relative. There were no other comorbidities, and he was not on any medicine. Medical literature was reviewed to determine whether this boxer with a solitary normal kidney should be allowed to box.

## Discussion

Boxing is a popular combat/contact sport in which points are scored by hitting the opponent on the head or body (above the belt). Punches below the belt or on the back of the head are prohibited. Body shots are common and can result in injury to intra-abdominal solid organs namely liver, spleen and kidneys. As early as in 1954 in JAMA, renal trauma in professional boxers was reported "Physicians who are attracted to the numerous telecasts of boxing prowess that are indigenous to the American scene may have wondered about the severity and extent of renal injury sustained by professional boxers. An answer is partly supplied by a recent study by Amelar and Solomon on 103 professional boxers who fought at the Madison Square Garden and at St. Nicholas Arena in New York City during 1952 and 1953. A freshly voided specimen of urine was collected from each boxer on the day of the fight and examined within an hour. After a bout, another specimen was obtained from each boxer within 5 to 20 minutes. Each specimen was examined for color, turbidity, specific gravity, pH, glucose, albumin, and acetone; a detailed microscopic examination of the sediment was also made. In 46% of the fighters the urine, which was clear before a bout, became turbid afterward."<sup>1</sup>

The American Academy of Pediatrics recommends that for a child with a solitary normal kidney, no restrictions be placed on participation in noncontact sports. Clinical judgement though should be exercised with respect to participation in contact/collision sports.<sup>2</sup> The Canadian Urology Association (CUA) guidelines were first developed in 2006 and updated in 2013. They were based on a

detailed review of relevant medical literature and include guidance on the operation of motorized recreational vehicles.<sup>3</sup>

As per CUA guidelines:<sup>3</sup>

**Parents of a young child with a solitary kidney should be informed of the following:**

1. *Their child has only one kidney. With current medical advancements, loss of that kidney would result*

*in the need for dialysis or a renal transplant, and lifelong medications.*

**a. Evidence:** *Indisputable.*

2. *Renal injury, of any etiology, increases the risk/ degree of renal insufficiency.*

**a. Evidence – Level 3:** *Children with a normal solitary kidney in childhood have an increased risk of renal insufficiency as an adult.*

**a. Evidence – Level 3:** *Trauma results in a decline of renal function on DMSA renal scan.*

3. *While renal injury can result from contact/collisional limited contact sports, the risks are less than the risk of head injury.*

**a. Evidence – Level 3:** *In American football, which is considered a "collision" sport, kidney injuries occur significantly less often than head injuries.*

**a. Evidence – Level 3:** *Those sporting activities most associated with high-grade renal trauma (bicycling,*

*Sledding, downhill skiing, snowboarding and equestrian), have more than a fivefold relative risk of head injury compared to renal injury.*

**a. Evidence – Level 3:** *in 2011 there were no children awaiting renal transplantation because of Renal trauma in the United States.*

4. *Parents should try to keep things in perspective. If they are not going to restrict a child from an activity. Based on the child having only one "head," then they should not restrict the child from that activity based on having only one kidney.*

**a. Evidence – Level 3:** *Those activities most associated with high-grade renal trauma (bicycling, Sledding, downhill skiing,*

snowboarding and equestrian) have more than a fivefold relative risk of head injury compared to renal injury.

5. Wearing protective padding during contact/collision and limited contact sports may decrease the risk of renal injury.

In an article published in the journal *Pediatrics* (official publication of the American Academy of Pediatrics), the authors surveyed members of the American Society of Pediatric Nephrology regarding their recommendations whether children with single, normal kidneys should participate in contact/collision sports or not.<sup>4</sup> Sixty-two percent of respondents indicated that they would deny participation in contact/collision sports. Eighty-six percent barred participation in American Football while 5% barred cycling. Traumatic loss of function of the solitary kidney was the most cited reason for denying participation. The authors reviewed the relevant medical literature. Cycling was determined to be the most common cause of sports related traumatic kidney injury (3 times more common as compared to American Football).<sup>5,6</sup> The authors concluded that it was unwarranted to restrict participation of athletes with a solitary normal kidney from contact/collision sports.

There are no published medical scientific guidelines whether athletes with a solitary normal kidney should be allowed to partake in combat sports such as boxing and mixed martial arts (MMA). As stated previously body shots are common in these sports. In boxing the “kidney punch”/“kidney shot” is a blow which lands on the back near the spine and over the kidney area. An intentional kidney shot is considered an illegal blow and is strictly barred as it has the potential to produce permanent renal injury. Experienced referees strictly enforce this rule. Failure to enforce this rule may result in suspension of the referee. Accidental kidney punches while not illegal still carry the potential of causing permanent renal injury with particularly disastrous consequences in the combatant with a solitary kidney.

Body shots to the abdomen are common in boxing and it is not unusual to detect haematuria in post-fight urine samples. There can be several causes for post-fight haematuria including but not limited to blunt force trauma to the urinary system (kidneys, ureter and bladder), dehydration and myoglobinuria. Myoglobinuria is caused by muscle breakdown and if not addressed promptly can lead to acute kidney injury. Combatants who have blood in the urine post fight should be advised to rest and hydrate aggressively. If haematuria

persists or is accompanied by pain in the renal fossa, they should be referred to the emergency department for specialist evaluation and management.

## Conclusion

Caution should be exercised when a combatant with a solitary normal kidney applies for licensure to fight. The combatant should be referred to a nephrologist for clearance to fight. The combatant should also be counselled that many nephrologists prohibit contact/collision sports participation by athletes with a solitary kidney. If cleared by a nephrologist, the combatant may be cleared to compete in combat/contact sport under close medical supervision. The referee should be advised to strictly enforce a zero-tolerance policy with respect to kidney shots.

## Acknowledgment

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## Conflict of interest

None.

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