BICYCLING: A SPORT THAT THREATENS MANHOOD

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Abstract- Cycling as a sport has undoubtedly taken the front stage in the society as people both young and old, hassle to be part of it, either for recreation, competition or both. It is indeed one of the many sports that people engage in. It is a sport that takes place at all levels of competitions, up to the Olympics. It is a sport that conditions the body so readily and carries many other advantages but if wrongly engaged in, bicycling could bring negative effects to the individual. Among the many disadvantages that bad cycling can cause are; pudendal nerve injury, reduced penile blood oxygenation and head injuries. For one to be able to enjoy the many advantages that bicycling can bring, this paper has made some suggestions among which are that the individual should adjust the bicycle to fit him/her, using standard safety equipment, learning correct techniques and positioning on the bicycle. If and when injuries still occur, in this sport, their general management had also been discussed in this paper, through the process of identifying the symptoms, assessing the injuries and the treatment. The paper also discussed how to rehabilitate the cyclist who had been treated for one injury or another.

I. INTRODUCTION

Bicycling is a sport that takes place at all levels of competitions, even at the Olympics. It is an increasingly popular sporting craze even in non-professionals especially children (Vaos, 1986). Bicycling is generally much "kinder" to the body than most other forms of exercises. It conditions the muscle while avoiding full weight bearing of the lower limbs (Garrick and Webb, 1990). It is thus a partial weight bearing, non-impact exercise. Less tension is developed in the muscle and muscles are less likely to be injured as compared with running. Despite less tension generation, bicycling, bicycling trains cardiovascular endurance as much as running does depending on the duration intensity and frequency of cycling.

II. MECHANISMS OF BICYCLING

Cycling occurs with a stable pelvis and little or no hip joint rotation. Certain parameters such as saddle height, cleat position, stem, handlebars, crank length and pedaling cadence can be adjusted and optimized to have an efficient cycling thus having minimal injuries. This way, mechanical incompatibility of a cyclist to his bicycle is reduced. The optimal position of a cyclist depends on the individual anatomical variation. Proper saddle height should be calculated as 107% to 109% of the limb length as measured from the greater trochanter to the floor. Saddle height should be such that knee remains moderately flexed and ankle moderately planter flexed at the point of maximum knee extension. The saddle is too low if the ankle is dorsiflexed at the bottom of the down stroke or it is dorsiflexed at clear top dead centre, the saddle is too high if the pelvis rocks from side to side as the cyclist pedals. The saddle is too far forward if a plumb line through the patella of the forward knee falls in front of the pedal spindle when the cranks are horizontal. The crank length should be 0.185 times the limb length measured from the greater trochanter to the floor. This derived length should be taken as the upper limit of desired crank length. The foot should be centered over the pedal spindle. The knee should not be held in too much valgus or varus positions for the movement to be smooth – upwards and downwards in a parasagittal plane when viewed from the front.

If the cyclist's elbow must be extended in order to reach the handle bar then it means the bicycle is too long. The length is also too short if the elbows are flexed more than 90 degrees and the spine is very rounded when hands are on the bar. In order to identify the bicycle length, the handle bar, stem must be adjusted or another suitable frame provided entirely.

III. GENERAL CAUSES OF INJURIES PECIFIC TO BICYCLING

Injury patterns are specific to specific sports. Understanding which injuries occur with each sport allows the examiner to diagnose and treat athlete easily (Plancher and Minnich, 1996). The types and severity of injuries secondary to bicycling ranges from pain and nuisance skin abrasion to life – threatening brain injury (Conti – Wyneken, 1999), which results in either musculoskeletal or neuropathic injury. Pathomechanical injuries in bicycling could be acute injury (trauma) or over-use injuries. The most common cause of over-use injury is training error while that of trauma is inappropriate use of safety measures. Gross incompatibility between a cyclist and his bicycle can cause injuries even in a single ride as evidenced by the high incidence of injury in people riding borrowed bicycles (Vaos, 1986). In minor incompatibility, the risk of injury increases with increasing intensity, duration and frequency of cycling. Most pathomechanical injuries in cycling seem to be as a result of excessive tension on the injured structures. For instance, when the bicycle

length is too long and the elbows are fully extended, there could be flexion related low back pain, excessive pressure on muscles of upper back, neck and hand. Prolonged cycling can cause compression injuries in the groin.

IV. INJURIES SPECIFIC TO BICYCLING

There are certain injuries that could be sustained primarily through bicycling; some of these are hereby highlighted:

1. Pudendal Nerve Injury (Compressive Neuropathy of the Pudendal Nerve): this is an injury associated with prolonged bicycling. The dorsal nerves of the penis are more vulnerable to compression between the pubic symphsis and bicycle seat. This is occasioned by the sitting position and rubbing movements during pedaling. This can be prevented by appropriate padding of seat, adjusting saddle angle and height and taking frequent pauses while riding (Wynn and Rnadolph, 2001). Pudendal nerve injury is said to be uncommon but it may actually be under-reported. This perhaps might be due to the sensitivity of the symptoms, Pubialgia (pain and perineum) and erectile dysfunction. Reporting this in our society may deal a big blow on the individual's manhood or personality.
2. Reduced Penile Blood Oxygenation: blood supply to the penis is reduced during cycling due to penile artery compression against the public bone. This was hypothesized to be a cause of impotence if oxygen insufficiency is severe. Attention to the design of the saddle is very necessary. Nayal, Schwarzer, Klotz, Heidrenreich and Engelmann (1999) advised that the nose of the saddle should point either horizontally or downwards and it should be well padded to reduce the severity of penile artery compression.
3. Cyclist's Palsy or Handle Bar Palsy: this is the numbness of the hand due to ulna nerve neuropathy, secondary to direct prolonged pressure on this nerve (Garrick and Webb, 1990).
4. Illiotibial Band tendonitis: occurs if there is in-toeing of the foot. This may lead to excessive internal rotation at the knee and excessive tension on illiotibial ban causing iliotibal tendonitis.
5. Patella Tendinitis: caused by excessive knee flexion while cycling. A too-low or too far forward position of the saddle causes excessive knee flexion.
6. Patello-Femoral Pain: A too-high or too far aft position of the saddle may manifest excessive tension in the hamstrings causing both hamstring tendonitis and patello-femoral pain due to improper tracking of the patella.
7. Achillies Tendinitis: caused by excessive dorsiflexion of the ankle
8. Head Injuries: occurs when the cyclist falls off his bicycle. Although the incidence of head injuries is reduced with the application of some safety measures, head injuries still occur in bicycling.

V. RISK FACTORS ASSOCIATED WITH BICYCLING INJURIES

i. Mechanical incompatibility between a cyclist and his bicycle
ii. Lack of education on bicycling
iii. Training error
iv. Lack of use of safety equipment In children, additional factors come into play:
v. Child's personality
vi. Play behaviour
vii. Excessive speeding
viii. Aggressive bicycling

VI. PREVENTION OF BICYCLING INJURIES

Since nagging injuries impair good performance, injuries should be prevented at all costs. To be able to achieve this, the following conditions should be addressed therefore;

1. Individual anatomical variation should be provided for, by adjusting the bicycling to fit the cyclist. Riders' position on the bicycle can also be adjusted.
2. Cycling proficiency classes and safety films can be shown in schools and even to professionals. This will teach the use of correct techniques and safer practices while emphasizing the importance of correct positioning on the bicycle.
3. Use of standard safety equipment helps prevent both acute and over use injuries. Some safety equipment for this sport are:
    a. Helmet: to prevent head injuries. A standard, light coloured, well-ventilated helmet may be more comfortable for the cyclist in hot seasons.
    b. Face and body crash pads
    c. Clothing: a clean cycling short prevents skin chafing and saddle sores. Use paid of padded cycling gloves to protect the hands.
    d. Proper cycling shoes: cleated racing shoes that can support the feet. Sneakers are not appropriate as they can deform when cyclist pushes.
    e. Scrotal protection is required
    f. Use padded saddles and hand bars

4. Cyclists should be conditioned to cycling in a specific environment with a particular weather condition in mind.
5. Use of non-slip padded saddles, hand bars and pedals.
6. Adult supervision is required for younger and inexperienced children.

VII. GENERAL MANAGEMENT OF BICYCLING INJURIES

To accurately recognize and manage these traumatic and over-use syndromes, one must be familiar with the following specific anatomic features, the common mechanisms of the injury, the physical demands of specific activities, the relevance of the clinical signs and symptoms and the acceptable treatment options (Boland and Deland, 1989).

VIII. SYMPTOMS OF PUDENDAL NERVE INJURY

a) Pain in the perineal areas and penis
b) Paraesthesia (numbness and tingling) in the distribution of the nerve (perineum)
c) Erectile dysfunction/impotence

IX. ASSESSMENT OF INJURY

1. Careful questioning on position of the cyclist and duration of cycling when symptoms occur
2. The cyclist should be observed on his bicycle to access "bike-fit" from the front, back and both sides of the rider.
3. Use of two-point discrimination test to identify sensory nerve dysfunction (Garrick and Webb, 1990).
4. Use of nerve condition studies (Wynn and Randolph, 2001).
5. Use of electromyography
6. Angiography should be used in diagnosis of blunt injury to the penile artery (Roth and Boyd, 1999).

X. TREATMENT

The prognosis and length of treatment are greatly influenced by the quantity of the first aid administered at the accident site and severity of injury (Billy and Kern, 1998).

- The initial treatment may include positioning, ice therapy and compression depending on the type of injury.
- Use of anti-inflammatory medication such as anti-inflammatory drugs or local corticosteroid injection.
- Modification of action causing injury is most important.
- Occasionally, operative intervention will be required for decompression of an entrapped nerve.

Generally speaking, perineal injury in bicycling demands urgent medical attention. Their proper management is of great importance, because of the possibility of major structural damage, as necrosis and infection may complicate any open wound injury.

XI. REHABILITATION

An early functional therapy is commenced to rehabilitate patient to an optimal physical functional state. Psychological rehabilitation strategies should be incorporated (Crossman, 1997), as symptoms of a pudendal nerve injury could be socially sensitive. Factors affecting psychological recovery include:

- Post injury emotional and cognitive reactions of the athletes
- Family and social support
- Athletes attitudes towards recovery
- The therapist, physician and coach support (Crossman, 1997)

Bicycling should be stopped completely for total healing of the nerve to take place. Return to cycling should be at the discretion of the medical personnel in charge. This depends on the results of the electro-diagnosis (electromyography, angiography, nerve conduction studies) and the status of the patients. Total rehabilitation is essential for a safe return to cycling (Boland and Deland, 1989).

CONCLUSION

Although bicycling is viewed as being relatively less dangerous than other sports, it can be a source of trauma if not carefully engaged in. Injury prevention should be targeted to promote safety. Adequate individual "bike-fit", bicycling-education and use of safety equipment seems to be the only way out.

REFERENCES

[1] Billy, W. & Kern, H. (1998): Diagnosis, First Aid and Classification of Muscle Injuries in Sport Medicine, Sportverletzung Sportschaden, 12(3) 87-93.
[2] Boland, A.L. & Deland, J.T. (1989): Sport Medicine, in Kelly, W.N., Harris, E.D., Ruddy, S. and Sledge, C.B. (eds). Textbook of Rheumatology. Philadelphia W.B. Sanders Company, 1820-43.
[3] Conti-Wyneken, A.R. (1999): Bicycling Injuries. Physical Medicine and Rehabilitation Clinics of North America, 10(1); 67-76.
[4] Crossman, J. (1997): Psychological Rehabilitation from Sport Injuries, Sports Medicine, 23(5), 333-9.
[5] Garrick, J.G. and Webb, D.R. (1990): Sport Injuries: Diagnosis and Management. Philadelphia W.B. Sanders Company, 37-47 & 139.
[6] Nayal, W., Schwarzer, U., Klotz, T., Hendrenreich, A. & Euglemann, U. (1999): Transcutenous Penile Oxygen Pressure during Bicycling BJU International 83(6); 623-5.
[7] Plancher, K.D. & Minnich, J.M. (1996): Sport Specifies Injuries, Clinics in Sport Medicine. 15(2); 207-18.

[8] Roth, J.W. & Boyd, C.R. (1999): Recreational Bicycling and Injury to the External Iliac Artery. American Surgeon; 65(5); 460-3.

[9] Swann, I.J. & Yates, D.W. (1989): Management of Minor Head Injuries. Hong Kong Chapman and Hall Ltd, 4- 5 & 92.

[10] Vaos, G.C. (1986): Genital and Perineal Injuries in Children Riding Bicycle. In McGregor, J.A. & Moncur, J.A. (Eds) Sports and Medicine *"Proceedings of the VIII Commonwealth and International Conference on Sport, Physical Education, Dance, Recreation and Health"* Cambridge University Press, 66-70.

[11] Wynn, T.T. and Randolph, A.L. (2001): Pudendal Nerve Injury associated with bicycling. A case report; *Archives of Physical Medicine and Rehabilitation*. 82(9); 1313A.

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