

GOALBALL PLAYER EQUIPMENTS
SIMPLE METHODS FOR PREPARING
PROTECTORS AND EYE SHADES

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PREFACE

When one gets a disability – whether physical, visual, hearing, or intellectual – opportunities of physical exercise decrease. And if the environment of an individual with a disability is disorganized, performing sports activities may be restricted.

Today, the Paralympic Games are increasingly gaining attention. Among its games, goalball is available for persons with visual impairment. The players are divided into two teams, and each team attempts to get the ball into the goal of the opposing team while preventing the ball from entering their own goal. Goalball is a competitive but simple sport that can be played if eye masks, goals, and a court are available. Equipment is not immensely expensive.

There is currently no specific equipment for goalball players, so this manual explains how to prepare the equipment for which is comfortable and safe and does not hinder player's competitive ability. The equipment can be prepared with ordinary materials. Even the protector can be devised so as not to hinder competitive power.

I hope that the equipment explained in this manual would be useful for goalball players with visual impairment, to enable them to enjoy this increasingly popular sport in various countries worldwide.

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Introduction

Sports participation requires proper equipment. Even track and field, athletes require running shoes and swimmers require bathing suits. However, proper equipment is not routinely sold for some minor sports. Proper equipment for individuals with disabilities that is tailored to their respective performances and disabilities is in high demand compared with sports of persons with no disabilities. Unfortunately, not all athletes with disabilities can easily obtain the required equipment. Moreover, those who cannot obtain such equipment tend to refrain from participating in sports, which is very unfortunate. Thus, the ability to create such equipment using everyday materials would be highly desirable.

This manual introduces simple methods for preparing protectors and eye shades for “goalball,” a sports game for persons with visual impairment, where such equipment is not commercially available. Preparation of such equipments for goalball players requires deep affection for the game and players. My desire is for those who obtain this manual to put in effort for making protectors and eye shades with deep affection.

Chapter 1.

Protector

In goalball, a sports game for persons with visual impairment, the ball is 24–25 cm in diameter and weighs 1250 g (± 50 g), which prevents it from bouncing too far off of the floor. As such, the ball is about the size of a basketball but weighs twice as much. In addition, the ball is made of natural rubber with a set hardness that it is harder than a car tire. As in soccer penalty kick shoot-outs, goalball players assemble in teams of three and alternatively and consecutively attempt to throw the ball into the opposing team's goal. Thus, like the goalkeeper in a soccer match, players must use their entire body to defend their goal. For top-level male players, even with the added weight of the ball, their initial pitching speed is said to approach 100 km/h. During defense, the body receives major shock, which is why players are encouraged to wear a protector. With regard to protectors, the only rule set by the International Blind Sports Federation (IBSA) is that uniforms, equipment, and padding must not extend > 10 cm from the body. Provided this condition is met, players can wear anything. Since goalball protectors are not sold in Japan, players use the protectors of other competitive sports. Moreover, wearing a protector is not mandatory. For females, children, and first-timer players, it is better to wear a protector to ensure safely.

The available protectors are chest (trunk) protectors that protect the trunk, hip protectors that protect the hip joint surroundings, elbow pads, knee pads, and shin guards. Here is a simple method for making a chest protector.



Three people per team guard the goal, which is 9 m wide and 1.2 m high.

1. Chest Protector Functions

The first function of a protector is to ensure safety, which requires superior “shock absorbency” and “comfort.” Apart from ensuring safety, a protector also aids the player in preventing the loss of competitive power by allowing superior “mobility” and “low elasticity” as described below.

1) Shock absorbency

During defense, players slide sideways on the floor to block the ball. For that reason, a chest protector and hip protector are needed to reduce the impact of the floor on the body (primarily trunk and hip joints). At the same time, the chest protector must also reduce the shock that arises when the player blocks the ball using the anterior surface of the trunk. In particular, there is the risk of heart commotion (commotio cordis); therefore, shock absorption in the anterior trunk is important. Thus, the chest protector actually protects the anterior and lateral trunk.

2) Comfort

Goalball is an indoor competition since sounds other than those pertaining to the game need to be blocked. As such, there are cases in which doors and windows are also shut, and some facilities do not have air conditioning. Therefore, the competition environment is commonly hot and humid.

Moreover, to protect the body from shock and friction from the ball and floor, excluding the head and hands, the whole body is commonly covered with a uniform. In situations in which the whole body is covered with a uniform, the dissipation of heat from the body surface is inhibited; therefore, symptoms such as dehydration and a high body temperature readily occur. As such, goalball players who wear a protector beneath the uniform are at high risk of dehydration and heatstroke due to high body temperature. Thus, the protector must not cause a further increase in humidity within the uniform.

3) Mobility

Goalball is not a recreational sport; when played as a competitive sport, the protector should not only ensure safety but also prevent loss of competitive power. Mobility is one factor that aids in preventing loss of competitive power. Ideally, players should be able to move easily so that they forget they are wearing a protector. The characteristic movements during the competition are deep bending of the hip joint and stretching of both arms in an upward slanted position during defense. These movements should not be hindered when the protector is worn.



The entire body is used when blocking the ball.



The hip joint is bent deeply when throwing the ball.

4) Low elasticity

Low elasticity is another factor that helps prevent players from losing competitive power. Even when a player is blocking the ball, if the ball hits the protector and bounces too much, it can be difficult for the player to confirm its location and it may move to the opposite side of the court. In contrast, if the ball does not bounce too much even when blocked, the player can quickly catch it. The player can assume the pitching position and swiftly attack the opposing team.

2. Protectors in Japan

The Japan representative class of male players wear only a hip protector and foul cup. However, female players tend to wear a variety of chest protectors for other competitive sports (baseball, lacrosse, karate) and hip protectors for inline skating, American football, and ice hockey. They also use elbow pads and knee pads made for volleyball and shin guards made for soccer.

The protectors and supporters mentioned above are generally easily obtained in Japan, but this may not be the case overseas. Baseball players may use protectors made for ice hockey and fencing. In other words, in goalball, for which there is no specialized protector, players must compete wearing protectors designed for other competitive sports.

3. Simple Method for Preparing a Protector

1) Materials and tools

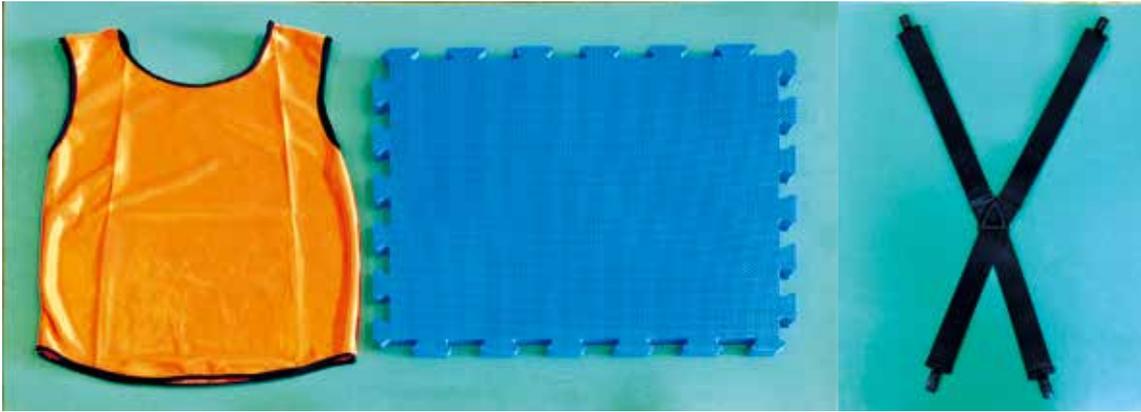
A simple method for preparing a protector using materials and tools that are easily available is introduced here. Since the materials that can be obtained in different countries and regions vary, it is preferable for one to add one's own ideas to the various materials when creating an original protector. The materials and tools that should be available are listed below.

Materials

- ① Bibs (if not available, a non-slip shirt or T-shirt can be used)
- ② Cushion material about 1–2 cm thick (a soft sponge where the finger touches the bottom when it is pressed is not acceptable; here a 1.5-cm-thick cushion spread on the floor is used)
- ③ Two pieces of elastic cord at least 2.5 cm wide and about 50 cm long (here 4-cm-wide suspenders are used)

Tools

- ① Knife
- ② Scissors
- ③ Sewing machine (if not available, you can make it by hand stitching)



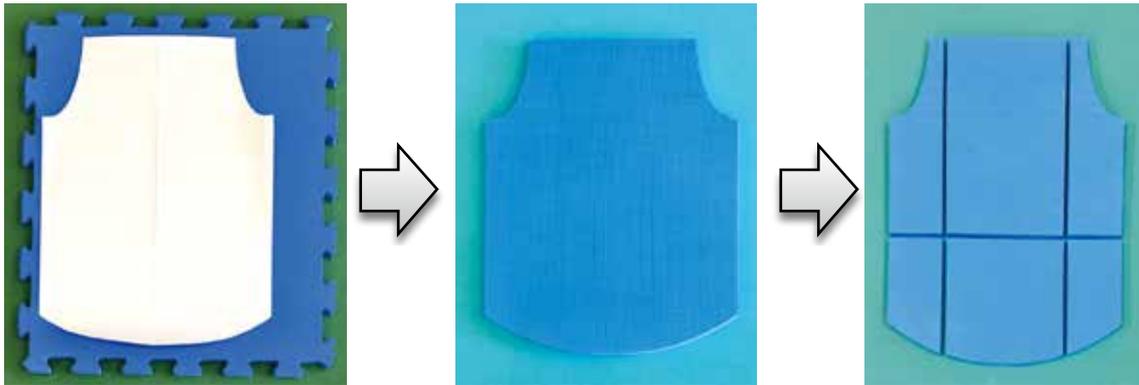
Materials (top) and tools (left)

2) Preparation procedure



(1) Paper pattern

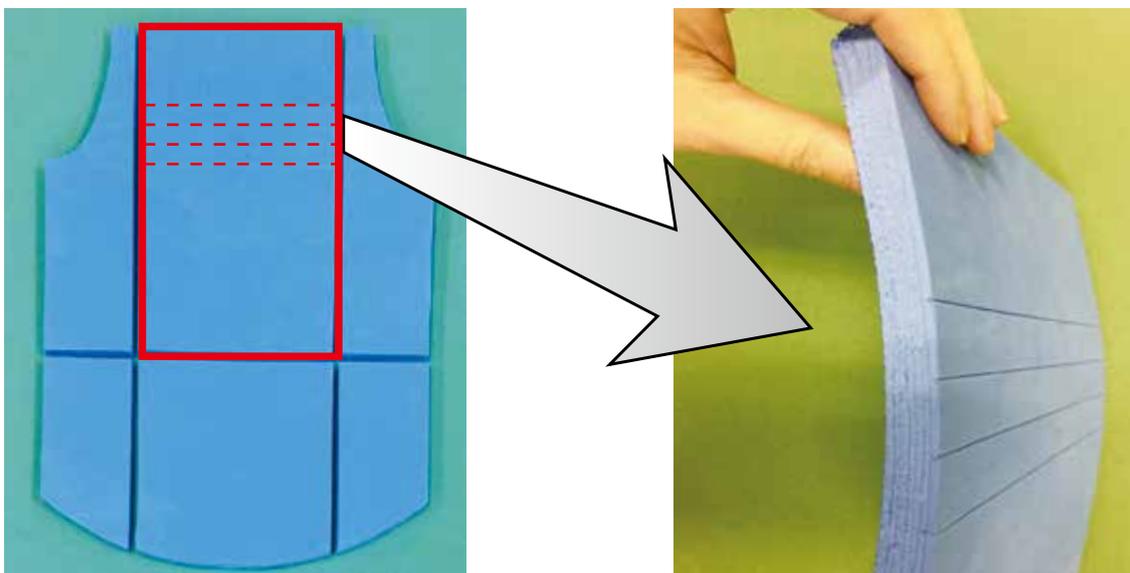
Decide on the range of the cushion and then prepare the paper pattern. For the range of the cushion, the top should be arranged so head and shoulder movement is not blocked, and the bottom should be at a level at which hip joint movement is not blocked to the top of the groin. Make the paper pattern a little smaller than the bib according to the cushion thickness.



(2) Cut out the cushion material

Cut the cushion material in line with the paper pattern.

Cut the design of the cutout cushion material into parts for each site to facilitate easy movement. The line separating the top and bottom halves can form wrinkles when the hip is bent and will be the navel area. The part that is divided into three longitudinal areas should be set so the arm and arm internal width when both arms are thrust forward is about the same width as that of the middle part. In doing so, you will be able to create a design that allows easy bending at the hip and moving at the shoulders.



(3) Making cuts in the chest part

As shown in the red frame, cut along the red dotted lines in the chest part. Once the lines have been made, the cushion material will bend easily and a good fit will be obtained. Make the cuts in the exterior of the protector to allow the cushion material to bend with the body.



(4) Sew the pockets for the cut parts

Sew the pockets for placing the cut parts. First, sew the parts along the blue lines as shown in the picture.



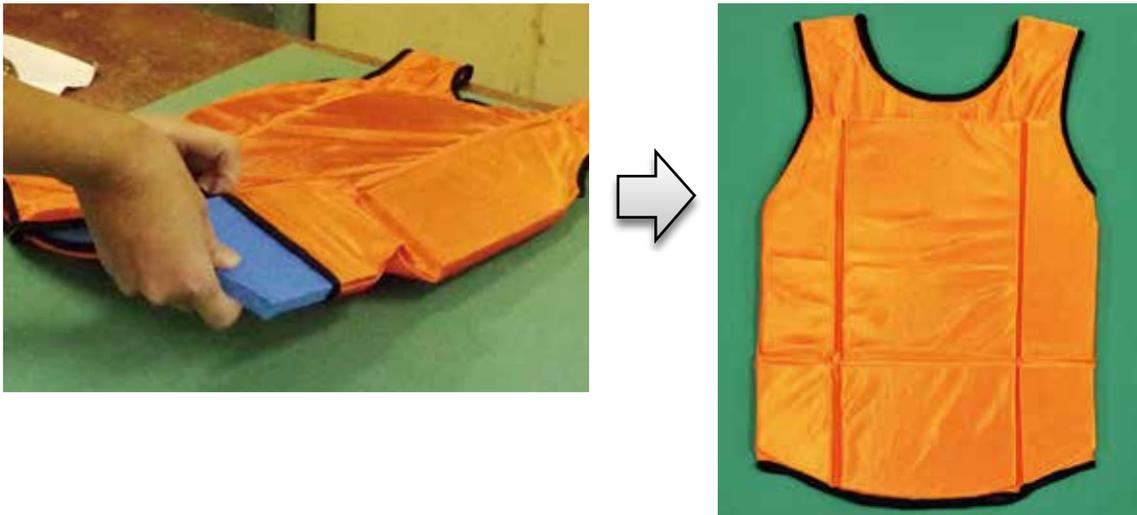
(5) Insert the cushion parts into the upper pockets

Insert the three cushion parts into the upper half pockets that were sewn in (4).



(6) Sew the base of the upper pockets

After placing the cushion parts into the upper pockets, stitch along the blue dotted line to close them. Sew the fabric on the sides of the cushions to minimize the extra fabric surrounding the cushion as much as possible.



(7) Sew the bottom part of the pockets in the lower half part

After placing the cushion parts into the lower pockets, sew along the blue dotted line to close them. If the cushion material cannot enter the pocket, adjust the size gradually by cutting it.



(8) Attach rubber belts to protector body

As shown in the photo, attach the rubber belts from the shoulder openings toward the border line of the lower part to make a crisscross. Here, instead of belts, suspenders were used to brace the body of the protector. It is perfectly fine to sew belts onto the protector body. If you use suspenders, make sure that they brace the body of the protector well. If the bracing power is weak, sew them onto the body of the protector to prevent them from coming off during the game. The protector is now complete.



Completed protector

Chapter 2.

Eyeshades

In a goalball competition, players must wear an eyeshade. According to the stipulated rules on eyeshades by the IBSA, they “must have total light blackout and be of a size and shape that blocks out vision. Even if the tournament organizer provides the eyeshades, they must be approved by the IBSA Technical Delegate before they can be used.” Based on these factors, the eyeshade is a tool that equalizes the level of disability between players since it completely blocks vision.

Wearing eyeshades to completely block vision creates a visual impairment. Thus, with eyeshades on, the competition will be equal for players with no visual impairment and with visual impairment and they can enjoy the game together. Many first-time players with no visual impairment are unable to move the moment the eyeshades are worn. It is natural for partially blind and sighted players to guide totally blind players. Eyeshades are used to completely block vision, so players with no visual impairment in particular can learn what must be cautioned about guiding other blind players. While goalball is a sport where blind and individuals with no visual impairment can enjoy playing in the same team under the same rules using eyeshades, individuals with no visual impairment are able to enjoy sports while experiencing a world in which sight cannot be used. One can say it is a universal sport where the fierceness of players with keen hearing can be realized as they are supported by blind players.

1. Required Eyeshade Functions

From the stipulation of IBSA that eyeshades “must have total light blackout and be of a size and shape that blocks out vision,” it is clear that eyeshades must completely block out vision and light and equalize vision among players. However, the ball may hit the eyes and face, so eyeshades must also provide protection. The functions demanded of eyeshades include “blocking properties,” “fitting” and “toughness.”

1) Blocking properties

The only function stipulated in the rules is blocking properties. Therefore, the most important function is to completely block player vision. Complete block means even the smallest amount of light must be blocked. Prior to the start of the tournament, the referee performs an eyeshade check to confirm that the eyeshade completely blocks the player’s vision. During the tournament, an eye patch is placed beneath the eyeshade. Eye patches can come off because of sweat. If the blocking properties of an eyeshade are inadequate, partially blind players will benefit. To prevent such an event from happening, eyeshades must be prepared with blocking properties as the first priority.

2) Fitting

Even if the blocking properties of an eyeshade are established, if it shifts from the worn position, it becomes useless. Moreover, the rules stipulate an eyeshade penalty according to which “during the game any player on the court who touches their eyeshades without the referee’s permission will receive an eyeshades penalty.” As such, if the eyeshade shifts from position during the game, the player must obtain permission from the referee to readjust it. Moreover, if the eyeshade keeps shifting out of place, a delay of game is called and the player receives a penalty. Therefore, eyeshade shifting also affects the player’s focusing power. As such, the width and position of the elastic band used to fix the eyeshade so that it fits the form of the face are also important.

3) Toughness

Although there is no stipulated rule for facial protection, particularly around the eyes, we believe that eyeshades must have that function as well. The goalball weighs 1.25 kg and is harder than a car tire. If such a ball hits the face, which is seen even with Paralympic-level players, players may have to leave the game temporarily with nose bleeds. Moreover, the eyeshade itself could become damaged, and broken pieces of plastic may enter and damage the eyeball. Therefore, the eyeshade must be strong so that it does not get destroyed or deformed and the face does not sustain injury when hit by the ball.

2. Eyeshade in Japan

In Japan, bike goggles, an improved form of eyeshades, are commercially available and used by many players. However, those presently on the market have durability problems. Eyeshade manufacturers are attempting to improve durability. Moreover, eyeshades must block out light, so black materials are commonly used since they absorb light. Various teams that played in the London Paralympics and the Rio de Janeiro Paralympics used the same black eyeshades. In Japan, there is a demand for sports equipment for persons with visual impairments to be colorful and stylish. Therefore, individuals with such demands are moving toward using colorful eyeshades.



Sample eyeshade used by female players in Japan

3. Simple Method of Preparing an Eyeshade

This method involves modifying goggles used in other sports into eyeshades. Anyone can easily make eyeshades from readymade materials.

1) Materials and tools

Obtain a pair of goggles that will completely cover the eyes. Goggles used in competitive swimming have a small lens and will break and injure the eye if hit by the ball; therefore, a pair of goggles with a large lens area must be chosen. Additionally, the frame of the goggles should be black. If black is not available, a color that is as close to black as possible should be chosen. Light readily passes through light colors and must not be used for eyeshades. Once the goggles are ready, the next step is to work on them to ensure that light does not pass through the lens and vents. A sheet of material that can block the light is needed. Material with adhesive properties such as wallpaper is easy to manipulate. If it is not adhesive, double-sided adhesive tape will be needed. Snorkeling goggles usually come with a nose cap. If this type of product is used, some soft spongy material will be required as well. The only tool needed is a pair of scissors. This manual will introduce one pair of eyeshades made using bike goggles and another using snorkeling goggles. Moreover, the adhesive sheet used is the artificial leather that is used in the surface of shoe insoles.

Materials I When motor cycle goggles are used

- ① Goggle (one that has a black frame)
- ② Material that can block light (one with adhesive is better; however, if not available, double-sided adhesive tape can be used instead. Artificial skin with adhesive used for shoe insoles will be used here).

Material II When snorkeling goggles are used

- ① Goggle (one that has a black frame)
- ② Material that can block light (one with adhesive is better; however, if not available, double-sided adhesive tape can be used instead. Artificial skin with adhesive used for shoe insoles will be used here)
- ③ Spongy material that is 1–2-cm thick (soft sponge that, when pressed with the finger, goes to the bottom)
- ④ Double-sided adhesive tape (used to paste the sponge material in ③)

Tools

- ① Scissors



Materials I. When motor cycle goggles are used



Materials II. When snorkeling goggles are used

2) Preparation methods

When motor cycle goggles are used



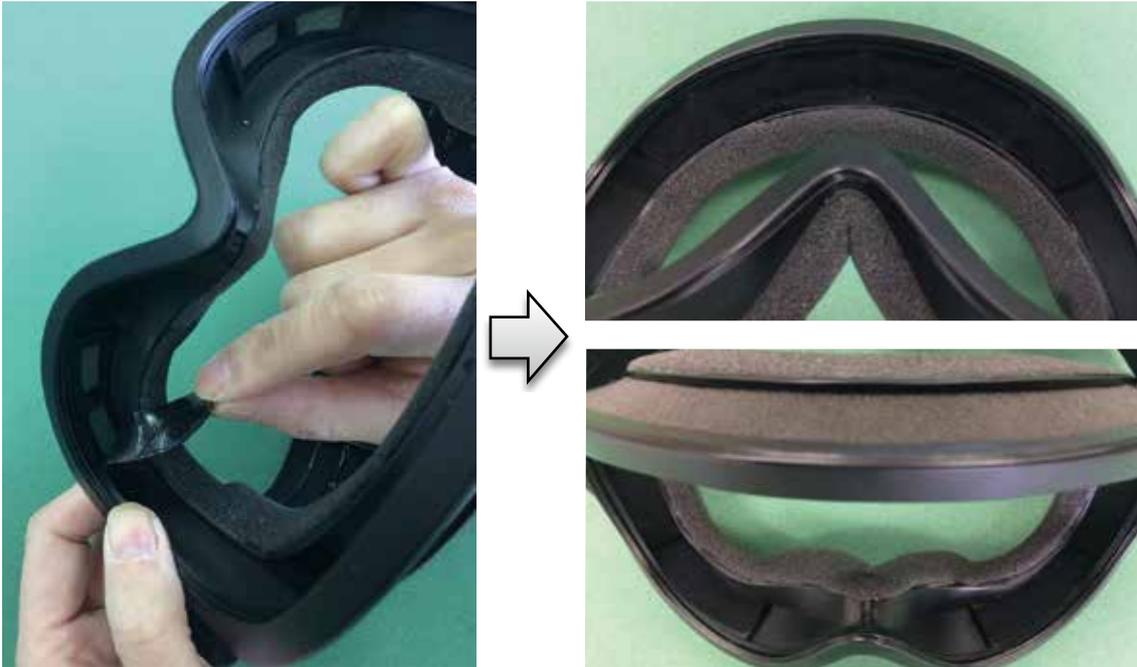
① Remove the lens

If the lens is removable, then remove it.



② Cut the light-blocking sheet along the shape of the vent holes

Cut the light-blocking sheet along the shape of the vent holes that are open in the frame area. The goggles used here have one area of vent holes at the top and two areas at the bottom. As such, three parts must be cut out.



③ Block the vent holes

Using the light-blocking sheet material that was cut in ②, block the respective vent holes. When so doing, cover every space leaving no gap so that light will not leak in.



④ Affix the light-blocking sheet onto the lens and fit it into the frame

Even for the lens, affix the light-blocking sheet that was cut in line with the shape of the lens. Here the sheet was affixed inside the goggles taking the appearance into consideration.

Once you have affixed the light-blocking sheet and fitted it into the frame, the eye shade is complete.

When snorkeling goggles are used



① Cut off the nose cap

During goalball, if the player's eyewear is a nose cap, breathing will become a problem. Thus, the nose cap must be cut off along the red dotted line as shown in the photo.



② Affix the sponge onto the nose cap area

Cut the spongy material to match the shape of the cut-out nose cap area. Use the double-sided adhesive tape to affix the cut spongy material to match the frame area.



③ Affix the light-blocking sheet to the lens

Affix the light-blocking sheet that was cut out in the shape of the lens onto the lens. The lens of snorkeling goggles cannot be removed. Therefore, the external part of the lens is easy to affix the sheet onto. Once you have affixed the light-blocking sheet, the work is complete.



Completed eyeshade (left: made with bike goggles, right: made with snorkel goggles)

Once you have completed the eyeshade, wear it outside on a bright day to check for leakage of light. If there is leakage, affix the light-blocking sheet onto the area of leakage.

3) Precautions in equipment repair and use

Since goggles are resilient to shock, polycarbonate material is commonly used to make the lens. However, polycarbonate is easily affected by harsh chemicals and is poorly compatible with plasticizers that contain vinyl chloride and rubber products. When used with either of them, it becomes brittle. Moreover, detergents containing surfactants can weaken polycarbonate. As such, one must confirm which materials can be used to create the goggles. If the lens is made of polycarbonate, avoid using materials containing vinyl chloride or rubber. Also, do not store it with rubber products, and do not wash it with detergent containing surfactants. Materials resilient to shock are used to make goggles. However, they are not made with the presumption that they will repeatedly be exposed to shock. For that reason, when they are used for goalball, cracks may develop. With the eyeshade that was prepared here, the light-blocking sheet was affixed onto the lenses; therefore, even if the lens becomes damaged, fragments will not fly out. However, once cracks develop, the lens will eventually break over time. To prevent injury, always check for cracks before and after using the eyeshade.

Conclusion

This manual introduced simple methods for preparing body protectors and eyeshades for individuals in regions in which goalball is uncommon and equipment cannot be easily obtained. Goalball is a sport that can be enjoyed equally by sighted and visually impaired individuals when eyeshades are worn. The information in this manual should help many individuals enjoy goalball safely.

