

HEAT STROKE – AVOID IT!

BY

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The author played rugby for twenty seven years from the age of eleven. He claims to have been no more than an average player but always loved the game. He lived in Japan from 1976 to 1990 and was involved in coaching school and adult rugby teams during that time, experiences that would take a whole book to write about. He took the RFU Level 2 Coaching Award in Cambridge in 1991 then passed Level 3 in 1997. He was recruited back to coach a high school team in Japan in April 1997 and has been involved in the school and regional teams since then.

He recently (10th May ,2005) wrote an article for the Technical Journal titled “Stamina – The Unwelcome Word In Rugby Training.”

It is said that experience is the best educator, but I hope that what follows will encourage all coaches and players to be aware of the grave dangers surrounding dehydration and heat stroke, thus avoiding the same terrible consequences we suffered.

Two years ago I took time off and returned to England for one of the RFU summer conferences. One of the topics was about dehydration and I felt smugly confident that the system we had in place was adequate. How pride comes before a fall! A few days later, while I was relaxing in England prior to flying back to Japan, the following happened.

As I was enjoying the relaxation spell in England, the Japanese players were coming to the end of our summer off-season and the assistant coaches chose one day to open our pre-season with a longish jog, “to start to get us all ready for when Steve comes back.” The day was warm, but not unreasonably so. It was humid, but not dreadfully so.

Toward the end of the run, one of our heavier front-row players suddenly collapsed, obviously in distress, and it could be clearly seen that he was suffering from heat stroke. All normal reactions were undertaken; the school nurse was called, the player was

wrapped up in a cold wet blanket and the ambulance summoned.

He was taken to a nearby hospital and attempts were made to re-hydrate him. The next day, however, the doctor announced that his liver was damaged beyond repair and that a liver transplant was needed at once or he would not survive. What followed is the stuff of Hollywood drama, but I will keep to the basics.

A donor was needed immediately and his mother was found to be suitably compatible. However, the procedures and rules of our local hospital were such that a liver transplantation operation could not be done there until after at least a week, which would be fatally too late, so another hospital had to be found.

Fortunately, one of the doctors knew the leading liver transplant surgeon in Japan. Working in The Kyoto University Hospital, the doctor had conducted well over 1,000 liver transplants at that time. The doctor was contacted and, even though he and his team had not done a liver transplant under those emergency circumstances before (most transplants are planned and thought out for months before the operation), he courageously agreed to undertake the transplantation operation if the player could be transported to Kyoto immediately.

Transporting the player from our local hospital to The Kyoto University Hospital was another huge problem; it was felt he would not survive a trip in an ambulance. After many discussions, his mother and father took the shinkansen (Japan's equivalent of intercity – a high speed express train) to Kyoto and it was agreed that he would be flown by helicopter the next day. The next day (day 3 - Friday), the entire region was covered by a blanket of fog and there was no possibility of the helicopter taking off. Just before noon, though, the fog lifted over a slightly longer route and they made the decision to make a run for Kyoto. Although it was dangerous in certain spots, they made it.

The operation was started at 6 p.m. that evening, the transplant was completed early the next morning and, by afternoon, the liver showed signs of 'taking' - the first step to success. That day (day 4 - Saturday), I returned to Japan and one of my assistant coaches called that night to say he was coming to see me with some news, but did not say what it was (I still had no idea!). He arrived at midnight; I was exhausted and could not imagine why he needed to see me at that time of night, but I soon found out.

I went in to school on the following Monday and we arranged a rotation of teachers and staff who would stay in the Kyoto University Hospital to offer support wherever we could, and I was assigned to go that day. I arrived at the hospital in the early afternoon and, at visiting time, went into ICU and saw the player lying inert. It was a heartbreaking sight. The next day he was still inert, but on the following Wednesday he was (apparently) awake and he seemed to respond to our faces and words. (I say “apparently” because he later told us he had no recollection of anything at that time.)

But the inspiring thing was that he could move – in fact he was all over the place and not really under control. The nurses had to put pillows all round the sides of the bed to cushion any impact and make sure he did not disturb or remove any of the tubes attached to the various parts of his body. I returned home in high spirits, and went down to the hospital again on the next Friday, where I found the doctors and nurses had been obliged to return him to a state of sedation.

I tried to find out why, but the medical Japanese language was beyond me and his parents did not seem to understand either. His cousin, who is a student at the Osaka School of Medicine, came to see the player the next day and explained to me why the staff had stopped him moving around. In addition to the damage suffered by the liver, he had also suffered severe rhabdomyolysis (rhabdo for short), which I did not know about in English, let alone Japanese.

I returned home and checked *rhabdomyolysis* in Google and the explanation is complex. However, stated simply, rhabdo occurs when the wall of a muscle is so damaged that it splits open and releases a lot of poisonous fluids into the blood system. When the fluids reach the liver, they usually clog it up so that it will not function. This leads to a backup of poisonous fluids in the body that cannot be flushed out and the consequences are potentially (and usually) fatal. According to the reports I read, there had been four such incidences of combined rhabdo and liver failure and all four people had died as a result. I did not find this news very encouraging!

Our player had to be kept under sedation for about six weeks while the hospital staff constantly flushed out his system; had he been conscious, the intrusion of tubes would have been unbearable. Slowly and surely, his system reacted positively to the drugs and medicines and he was allowed to return to consciousness, a joyful day for all involved.

Three weeks later, he was allowed to return to the local hospital and one month later was discharged. He returned to school and eventually began again to live the life of a reasonably active seventeen year old. He had to be careful for several months more, but we had a party to celebrate his one year anniversary – the first person in the world to survive this potent mix of diseases. My happiest moment came several months later in a PE lesson, seeing him run effortlessly to catch a ball in a softball game.

Make your players aware of the potential dangers, and MAKE them drink.

Prior to this incident, I *thought* that our system for hydrating our players was good enough, but clearly we had to improve on it and, since then, I have never stopped reading whatever I can to make sure we are doing our best to make the players aware of the need for re-hydration and *make* them follow our rules. If I can help you avoid what we went through, it would make me feel a lot better.

Most club teams start their pre-season in the summer months and, jokes about the English summer apart, the weather is a lot hotter than we imagine and the potential for dehydration is all around. Most of us don't realise when the level of humidity is in the danger zone. We have installed a humidity-measuring machine on the outer wall of our clubhouse and we monitor it every day to make sure we know what the weather conditions really are. On the days when the humidity is at the danger level, we alter the training to avoid possible dehydration.

Many training regimens suggest/recommend a 3 kilometre run somewhere early on in the scheme of things, something I heartily oppose. My system for longish running (on the rare occasions that we do it – which is usually when we cannot use the pitch for one reason or another) is to make three-man relay teams (one front five forward, one lean speedy back and one more in-between, to ensure that the teams are all pretty equal), so that the running time is one third and the recovery time is two thirds. The distance we use for stamina is 600 metres and each player usually runs four sets. *Every time* they return, the players are obliged to drink a measured amount (see following tables) to maintain hydration. (On the day of the incident, the players were sent on a six-lap run around the school perimeter - a total of about six kilometres).

How much fluid is enough?

Most of us *do* arrange for water to be supplied to the players – especially in hot weather, and most coaches do as we used to – tell the players to drink when they feel thirsty.

However, this is not enough, because when the players become thirsty it is too late.
But how much *is* enough?

I found the following table that my players and coaches could read on an internet guide here in Japan, so we copied it and gave a copy to all of our players. We read it through with them and ran a quiz the next day with sports drinks for those who knew the right answers (prizes to give a positive method of reinforcement) and we sometimes test them on the pitch (penalty push ups, etc., for those who don't remember – negative reinforcement) to make sure the information has stuck.

Guidelines for liquid intake during exercise		
Timing	Before practice	About 30 minutes before starting
	During practice	Every 20 minutes or so
	After practice	Immediately after, then throughout the day until bedtime (including mealtimes)
Quantity of fluid to be taken in	Before practice	About 250-500 ml. in total, taken in portions
	During practice	One mouthful (about 200 ml.) each time
	After practice	Amount needed to replace the weight lost in practice – taken over a period of time
Temperature of fluid:		Normal (room) temperature, cooled to 5°C – 15°C
What kind of fluid:	During practice	If possible, water with a sodium concentration of 0.1%-0.2%, sugar 3%-5% concentration
	Remarks:	Find the best way, type of temperature and type of fluid to suit you (your players) but DO IT

Another point that we noted from a separate table was that players (and everyone, really) should focus on getting into the habit of taking in hydrating fluids on a regular basis, and the following was recommended.

Guidelines for fluid intake on a daily basis under normal lifestyle conditions	
Timing	When you get up, meal times, other times, just before you go to bed
Volume	150ml-200ml. (One glass)
Temperature	Whatever suits the occasion (cold when the weather is hot, warm when it is cold)
What kind of fluid	Fruity drinks, isotonic (sports) drinks, water.

As you can see, the advice is very flexible, but the message to pass on is that people generally do not drink enough to maintain the body's systems efficiently. Encourage more fluid intake.

Japan is a very hot country and rugby is played all year round, including the months of July and August (in fact we always think it a clever ploy that the JRFU invites teams from Europe to play during this energy-sapping time!). A number of Japanese sporting youngsters have died from heat stroke in recent years and a day never goes by without us hearing on TV that a player of one sport or another was rushed to hospital suffering from heat stroke. So, we have to be very careful.

But even our players tend to be lazy about taking in fluids (especially before training starts) and this is where we all have to be so careful; we have to *tell* them to drink, and *follow it up*. We used to have a system where the players' water bottles were filled constantly during a practice, so they (and we) never knew exactly how much they consumed. We recently stopped that and the bottles are only re-filled when they are empty, so we can ask a player, "How much have you drunk?", and the players can tell us exactly. There is a huge gap in what players drink; our best player (Number 8) drinks at least two litres a session and yet other (good) players drink very little – it seems to reflect their sweat systems as much as anything else. (Although I want to force feed them water, there is an equal danger to overdoing the fluids).

However, the universally accepted advice, simple as it is, states, "Have fluid in your system when you start the session and drink little and often to maintain the level." If your players look dozy and lethargic in the hot weather, stop them and cool them down as quickly as possible, because they could be suffering from lack of fluid.

Summary:

My purpose in writing this is not to say, "Do this" or "Do that", because not even the experts have all the answers. The purpose is to say, "Put a hydration plan into practice and be rigorous about it". This is only the tip of the iceberg and I assume you will want to find out more. Go to Google and look under heat stroke, hydration, dehydration, etc. Look at the articles that are written by the contributors of Peak Performance, which can be picked up from Google; they are very clear and concise and, in particular, are very good for explanations about water, isotonic drinks and recovery drinks.

Although the complete recovery of our player was a source of great joy for us, the fact that the incident happened at all was traumatic. However, the fact still remains that, as of now, he is the only person in the world *not* to be killed by a combination of rhabdo and a wrecked liver. I hope and pray that none of you will suffer the same experience.