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Where biomedicalisation and magic meet: Therapeutic innovations of elite sports injury in British professional football and cycling



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ABSTRACT

Injury is a conspicuous feature of the practice and public spectacle of contemporary elite sports. The paper argues that the 'biomedicalisation' thesis (medico-industrial nexus, techno-scientific drivers, medical optimisation, biologisation, the rise of evidence and health surveillance) goes some way to capturing the use in elite sports injury of some highly specialised mainstream therapies and some highly maverick biological therapies, which are described. Nevertheless, these main strands of biomedicalisation do not capture the full range of these phenomena in the contexts of sports medicine and athletes' practices in accessing innovative, controversial therapies. Drawing on multi-method qualitative research on top-level professional football and cycling in the UK, 2014–2016, we argue that concepts of 'magic' and faith-based healing, mediated by notions of networking behaviour and referral systems, furnish a fuller explanation. We touch on the concept of 'medical pluralism', concluding that this should be revised in order to take account of belief-based access to innovative bio-therapies amongst elite sportspeople and organisations.

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1. Introduction

Elite sport has become one of the defining spectacles of the modern era. Promulgated via mass media its reach is global, and clubs and teams are packaged through highly visible corporate branding. Annual company spending on advertising in sports in the US has been estimated at \$34.9 billion in 2015 (Plunkett Research, 2016). The global sports industry has recently been growing at a faster rate than overall GDPs (AT Kearney, 2011). The consumer markets are enormous, steadily growing and include the massive sports gambling industry. The global reach and audience for football (soccer), the most capitalised sector by far, epitomises these trends, and the English Premier football League (EPL) is the most lucrative worldwide. Although based in the UK, men's professional football clubs and teams at the highest level have high proportions of performers brought in from overseas in market transactions. The

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top-tier EPL currently has around two-thirds of players who are not UK nationals. The very top players can command salaries of tens of thousands of pounds per week, and though the scale is lower in professional cycling the very top riders winning international events can earn annual salary of £1–3 millions (Hervey, 2015). These sport businesses are associated with a wide variety of professional organisations, agents, service and product providers, media companies, sponsors, event organisers and so on. Acknowledging this, sport has been analysed as a global capitalist phenomenon of a 'sport-industrial nexus' (Manzenreiter, 2005).

This marketisation of elite sport consequently produces extreme performance pressures on clubs, teams, managers, coaches, trainers, sports associations and athletes, especially those at the highest levels in their sports. One of the consequences is a conspicuous high rate of injury. Considered as a workplace, injury rates in football (soccer) are one thousand times greater than that for other industrial workplaces (Ekstrand, 2015). Musculoskeletal bone or soft tissue injury is highly prevalent, and organ and mental health issues also arise. The scope of potential diagnosis and treatments available to athletes is vast, varying from low-tech massage techniques to high-tech interventions such as

shockwave therapy. These therapies are now being joined by novel, innovative biological techniques, some seen as part of the new wave of 'regenerative medicine' on which we focus here.

Elite sports' large resources extend to medical coverage. In the two sports examined as case studies in this paper, professional football and cycling in the UK, similarities and differences can be observed. Professional international-level cycling teams (of which there are about ten based in the UK, comprising 10–15 contracted riders each), like football clubs, typically have a range of commercial sponsors and operate as branded businesses. Most employ one or more doctors/medical directors on full or part-time bases along with others such as nutritionists and sports therapists. In the UK substantial public funds are provided to 'British Cycling', which has both Olympic and popular strands, via national agency UK Sport, which draws on government and public lottery sources. Medical cover is provided to the elite riders through an 'Athlete Medical Scheme' run jointly with BUPA, the largest private medical insurer in the UK. Professional cycling teams employ a variety of medical insurance arrangements and direct payment routes that take into account the extreme mobility of teams in racing and training, including overseas events. Somewhat similarly, medical coverage for top-level footballers and clubs is provided by the 'Medical Care Scheme' (MSC) run by *Health Partners* which is a charitable trust. Nowadays the highest level clubs typically employ full-time specialised medical or physiotherapy staff. Almost all the clubs in the English football league (87/92), including the elite English Premier League (EPL) (19/20), are protected by the MSC scheme, which involves clubs paying for cover for their players for specialist treatment on an annual basis, premiums related to claims history.

Of particular interest in the study analysed here, is the range of biological and regenerative cellular therapies such as stem cells and 'platelet-rich plasma' (PRP, described below) whose use for treatment for 'return to play' is intensively debated by the sports medicine community. Some international producers of regenerative products address orthopaedics practitioners, defining the field as 'orthobiologics', and targeting sports medicine markets. Given the degree of scientisation and commercialisation of medical products in the field, it is thus reasonable to conceptualise it, building on Manzenreiter's concept above, as a 'Sports *Biomedical Industrial Complex*'.

2. Conceptualising the therapeutic context

A wide range of structural forces, knowledge practices, medical technologies, inter-related practitioners and institutions can be thought of as constituting the 'therapeutic context' of elite sports. Sports medicine and 'sports science' (biomechanics, physical optimisation, etc.) have mushroomed over the last 30 years, becoming key strands of that therapeutic context. At the same time there has been an increasing biologisation of medicine itself, which has changed the nature of medicalisation (Conrad, 2005). The concept of 'biomedicalisation' thus offers itself as one possible lens through which to help understand current developments in elite sports medicine. According to Clarke et al. (2003, 2010a) there are five key and novel dimensions that are apparent in a broad shift from medicalisation to biomedicalisation. Clarke et al. point, first, to an integration of business and medicine (in the U.S. context), that they term the 'Biomedical TechnoService Complex' (aligning closely with Manzenreiter's concept noted above); second, a 'technoscientization' of medical practices; third, transformations of biomedical knowledge production including especially informatics and medicine's 'evidence-base'; fourth, a focus emphasising health status, risk and surveillance for example through lifestyle research and policy; fifth, biomedical intervention becoming involved in transformations of bodies and individual and collective identities,

including an increasing focus on optimisation and enhancement (Clarke et al., 2003, 2010a). Clarke et al. note the extension of biomedicalisation to many domains of (American) society.

We can observe these dimensions of biomedicalisation in elite sport beyond the U.S. in the academic disciplines of sports science and sports medicine, in the increasing corporatisation and globalisation of sport, in the availability of elite 'evidence-based' medical practitioners in sport, in the high levels of monitoring of sports performance through informatics, in the continual search for science-based higher levels of performance and the implications of this for the professional and personal identities of sports performers and their organisations. Hence, the conceptual lens of biomedicalisation clearly has some purchase on recent scientific and biomedical expansion into sports.

Nevertheless, as we demonstrate below, although biomedicalisation coexists with traditional or 'complementary' medicine (Clarke et al., 2010b), this formulation does not capture the full range of the therapeutic context that we report below in elite sport medical behaviours. Before considering what concepts might help us to understand these behaviours, it is necessary to describe the methodology of the research on which we draw, to describe the biological therapies of primary interest, and to present some of our data. The paper then argues that a concept of 'magical' practices and practitioners, and faith-based healing can help account for the elite sports injury practices, organisation and beliefs that we observe, including reference to the relatively sparse sociological literature on the role of 'magic' in sports medicine (Carter, 2010; Malcolm, 2011). We use the term 'faith-based' to refer to a general act of evidence-free belief or emotional commitment, not to refer to fundamentalist faith communities, a usage common in the United States.

3. Methodology

The overarching aim of the study on which we draw was to investigate, first: commercial, scientific, club, insurers' or other stakeholders' perspectives on appraisal and use of biological and cell-based bio-therapies, including those now known as regenerative medicine; second, to illustrate some of the typical decision-making emerging amongst elite sports medical practitioners, and the dilemmas and ethical issues raised in the context of institutional pressures and long term welfare. As noted above, we focused on case studies of UK professional football and cycling. Musculoskeletal injury was the main clinical focus. The two sports were chosen because of their very different funding profiles, with cycling in the UK being part funded through public sources (UK Sport – British Cycling), the very different forms of club/team organisation and competitions, and the differences in typical injury profiles.

Ethical approval was obtained from the University of Sussex, UK. Between 2014 and 2016 we conducted semi-structured interviews with a highly specialised group of 42 practitioners and stakeholders in the UK, including the heads, deputy heads, academy heads or head physiotherapists of English Premier League (EPL) football clubs (12), medical or physiotherapy practitioners involved in professional cycling (2), companies providing biological therapeutic products (7), medical members of national and Olympic sports organisations and authorities (8), sport and exercise physicians and orthopaedic surgeons in the NHS and private practice (10), medical insurers/advisers (2), retired performers (5), and sports scientists and researchers (5) (not mutually exclusive categories). Interviewees were recruited through personal contacts, conferences and the project sport-specialist advisors; they were given written information and gave explicit consent to take part. We also observed sports and exercise medicine conferences, and specific 'football medicine' and 'cycling medicine' conferences (in the UK,

Italy, Denmark and India), and collected documents including scientific research articles on bio-therapies of interest, mass media commentary, and sport-specific magazine/blog materials. Supporting data can be found at: <http://biosportproject.org.uk/> and by application for confidential access to interview materials in NVivo format from the corresponding author. We deployed conventional content analysis techniques, coding the interview data using Nvivo software. We use the term 'athletes' at some points to refer to sports performers in general, not meaning 'track and field' and other 'athletics' sports. Our content analysis derived the following overarching themes: conservatism versus experimentalism in medical attitudes; therapy perspectives divergence; conflicting versions of 'evidence'; subcultures, community beliefs/practices; and negotiation of medical decision-making. This paper touches on each of these themes, while focusing especially on beliefs and practices related to medical experimentalism.

4. Novel bio-therapy techniques currently used in UK professional cycling and football

A range of known biological and regenerative techniques were our main focus. Brief descriptions of these follow. *Traumeel* is claimed to be a 'natural' homeopathic treatment that 'relieves musculoskeletal conditions – pain and inflammation ...'; it contains ingredients from fourteen mostly flower-bearing plants (<http://www.traumeel.com/>); *Actovegin* is made from filtered extract of calf's blood and is used medically (sometimes in conjunction with *Traumeel*) to treat muscle strains and is best known for being used by the former Chief Medical Officer for the German national football team and Germany's most successful team, Bayern Munich; *prolotherapy* involves sclerosant (irritant to inhibit bleeding) injections to ligaments, claiming to strengthen/tighten ligaments and includes dextrose or glycerine; *viscosupplements* are hyaluronan (molecules found in soft connective tissues) based lubricants, some of which are synthetic and one of which is derived from rooster coxcombs. *PRP* is the most widely discussed and studied of these techniques in sports medicine currently, it involves extracting blood from the patient, and treating it in a high-velocity centrifuge to separate components, producing a high concentration of platelets and growth factors thought to aid the healing process by cell growth. It is used to treat articular and cartilage injuries, and tendon and ligament injuries. Finally, injectable 'adult' stem cells are also being researched and debated for use in sports injuries, as elsewhere. Although some of the techniques studied claim a 'regenerative' function, we do not discuss here the relationship between this and the current broad 'rejuvenation' and 'anti-ageing' movement (Faulkner, 2015).

5. Data and analysis

In this section we establish that many of the biological therapies currently controversial within sports medicine are widely (and legally) used amongst many elite sports performers. We present evidence from our participants about the pressures on medical decision-making and how practitioners may have strong collective preferences for certain techniques but not others. We highlight the role of the beliefs about available therapies, and how medical practitioners may deal with such beliefs in attempts to optimise treatment. Brief evidence about the importance of referral networks is presented, and we then highlight some negative attitudes toward these biological therapies, and ask how, beyond the primary trends of 'biomedicalisation', we might better understand why many athletes and their organisations access such practitioners and forms of therapy.

5.1. Pressure to innovate

Given the time pressures of elite sport, where performances at the limits of the athletes' capabilities are required in regular events, there is acute pressure on practitioners to identify the most effective and rapid treatments for athletes' injuries causing inability to perform at an optimal level:

Part of the problem here is that there is a desire to jump on the next innovation with zero data in every way, driven partly by the desperate need at primary care level (to) support physios and doctor at the club needing to do something and needing to do the most trendy thing that's available. (Orthopaedic surgeon working with several elite sports)

And:

(there is) so much innovation out there looking for a good home that we've never found shortage of opportunities. (orthobiologic distribution and development company)

Hence, globally known UK-based sport stars are known to have undergone a variety of controversial treatments, especially platelet-rich plasma (PRP), stem cells, Actovegin, and a treatment involving horse placenta, spurned by many medical practitioners. These therapies are provided by a variety of practitioners located in different parts of the world. The athletes involved, as a matter of public record, include Usain Bolt, footballer Steven Gerrard, marathon athlete Paula Radcliffe (Actovegin), and Tiger Woods and Rafael Nadal (PRP, and in Nadal's case, also stem cells) (Tudor, 2016; Wikipedia, 2016; Lopatto, 2016). The use of such treatments has evoked some mass media headlines, unsurprisingly often accentuating the controversial aspects of the therapies, for example:

World Cup Star Turns to Mystery Stem Cell Treatment'. There isn't a whole lot known about this stem cell intervention for Di Maria, but most likely it is an autologous (self) transplant of adipose stem cells or platelet rich plasma (PRP). (<http://www.ipscell.com/> 7 July 2014)

REVEALED: How broken Nadal was rebuilt with the help of blood spinning to achieve one of sport's greatest ever comebacks. (*Daily Mail*, 8 Oct.2013)

The 'blood spinning' referred to above is the more colloquial term for the PRP technique. PRP has strong adherents, especially in football:

But in the cases where I've used PRP ..., we had a player who's presently playing Premier League who had a ... one and a half centimetre separation of an adductor tendon off the bone and I used PRP twice on that and he was playing five weeks later ... Now, it's three months if you have surgery on that, if you're lucky. (EPL club medical lead)

The extreme corporate pressures for speedy 'return to play' are obvious here, and this accords with a straight biomedicalisation perspective.

5.2. Therapeutic subcultures

It is clear from our interviews that certain therapeutic techniques elicit strong collective adherence in sport-medical organisations. These faith-like commitments may conflict because of the range of organisations and networks that elite athletes are

frequently affiliated to. Sports professionals may become subjected to different sources of medical advice (ranging from surgeons to commercial agents without medical qualifications), which can require interaction between different medical practitioners and domains of responsibility. An example of this was a young African football player who sustained a broken tibia during a televised club match in the UK:

And he was due to represent his country in ... the World Cup, actually, that summer ... he'd be looking at a six month rehab period ... he was needed for qualifiers ... And in the ambulance to the hospital, he took a phone call from his national team doctor and then from his agent, making a recommendation that he flew out to Aspetar (an elite private multinational sports medicine research and therapy centre based in Qatar) And what was he doing going to ... an NHS hospital where he's then going to sit and wait in Casualty for ... So, it's hard saying to this person, "Okay ... you probably shouldn't fly out there because you've got a lower limb injury and there's a risk of blood clot ... And I'm having to justify myself to somebody I've never met, who is busy trying to manage my patient (EPL club medical lead)

The type of clash of medical practice regimes illustrated above also appears in relation to the biological therapies that we focus on in this paper:

they ... want to do *Prolotherapy* now on the superior tibiofibular joint which wasn't a symptomatic joint when they went down there. And that's something that I've asked them not to do because in my experience we've never had problems with that joint and why would we want to use Prolotherapy? But the sports physicians (there) have experience in Prolotherapy. You may call it innovative. I call it limited. So, I prefer not to inject ... (senior doctor in professional cycling)

Of course, the well-known problems in professional cycling with 'doping' make injections a sensitive subject in that sport. A commitment to particular biological techniques can become embedded in the culture of particular clubs or teams:

... having been in different football clubs one team will go fanatically for *PRP*. Another team will go fanatically for something *stem cells*. And I just say nothing ... It just depends on—I think there's a place. We've got to keep moving forward and finding places, but I don't think you should ever be besotted on one particular thing.

Q: How does the insurance industry view these things?

A: They've got no option. (Sports medical insurance consultant)

Equally, performers' own beliefs may shape these collective preferences:

If I don't think it's dangerous, I don't think it's unethical I will possibly, sometimes, allow players to do things because of their belief system because if ... a person you've got trust in. So, for example, I've ... worked with Dutch players regularly who are very heavily into deep soft tissue massage, they honestly think it's the best thing since sliced bread. (EPL club medical lead)

Although such behaviour structures may be less common in cycling, nevertheless, the native country, national teams, and language of the athlete may be significant.

In cycling it's very much still a doctor led sport. There is no pressure from managers to choose any particular surgeons ... And there's no pressure from agents. With the pro team it's sometimes more appropriate to have treatment nearer home, particularly with the same language speaker, say going back to Country X for an operation ... ' (lead physiotherapist in professional cycling team)

And:

I: When you said for example there was a bit of use of *Traumeel* by German, Belgian, Dutch but not French and not Italian. Does that suggest to you that there are micro communities in cycling sports medicine ... ?

R: For sure. And many of that comes from also different culture in education and sports medicine. For instance, in Italy there is a large use and in Spain of drugs which are kind of anti-oxidant or inhibitor, protector like – I don't know – you have ... other kinds of drugs which were mainly used, for instance, in Italy or Spain. (senior doctor in cycling)

Again in the above we can note the importance of the incorporation of innovative, often commercial biomedical products in the national and personal identities of the elite athletes in question, and the evidence of sport as a corporate enterprise, according with the concept of a medico-industrial 'Complex' in biomedicalisation. Equally, this institutionalisation of collective beliefs and practices accords with biomedicalisation's concept of how personal identity has become ensconced in biomedical therapeutic concerns and physical optimisation. However, what is less explicitly emphasized in the main strands of biomedicalisation, though evident in its applications, is the embedding of collective biomedical beliefs and practices in local and widely diverging subcultures and organisations, which also is illustrated above.

5.3. Specialisation and referral

There were a small number of elite surgeons whose names were repeatedly mentioned by our interviewees. These same individuals were often speaking in plenary sessions at sport-specific medicine conferences. Trust in such people as appropriate surgeons for specific conditions would be built up through personal contact:

R: So your initial audit is based on meeting the person, which we do ... we got this guy ... to come and present to us in the medical department on knee problems ... we quizzed and questioned him on it when he did it, before we referred him to anybody ... (EPL club medical lead)

Emphasizing the interpersonal, face-to-face nature of this process, one informant, talking about how he selected which conferences to attend, stated:

I meet the people that I want to meet. I see the surgeons, I speak to them, I see the international surgeons and networking in our business is a big thing. If I need a player to get operated on or a decision, I need to be going out there to speak to the (frequently mentioned knee surgeon), to the (elite orthopaedic surgeon) or whatever else.

If they see you as presenting at conferences you almost then get a bit of social down time with them, there is a little bit of respect ... (EPL club medical lead)

Here also we can see the workings of biomedicalisation as Clarke et al. describe it, with the emphasis here on the institutionalisation of elite expertise and invocation of the 'evidence-based medicine' paradigm of evaluation of therapies. However, we also see here an emphasis on interpersonal networking and inter-professional trust which is not so much a feature of the primary biomedicalisation thesis.

To summarise, in the above we have provided a range of evidence about referral practices, trust-building, medical specialisation, collective commitments to therapeutic practices and decision-making in the context of high pressures of elite sports injury. The focus has been on the ability of medical teams to negotiate the therapeutic pathways that performers should follow. Examples of some biological therapies have been included in this discussion. At various points we have noted the applicability of the main biomedicalisation trends. We now turn our attention to focus more closely on the biological therapies, and to introduce data that shed further light on debates about them and practices of actually employing them in medical strategies.

5.4. 'Snake oil' and 'witch-doctory' therapies

Our interviews show a number of informal, derogatory terms being used about controversial therapies. These include terms such as 'snake oil' and 'witch doctors':

Injectables and cell therapies? Lack of evidence really. Stem cell therapies. A lot of this is still very experimental. Or, if it's not, ... it's almost a little bit ... what's the word I'm looking for, *witch-doctory*. (national-level sports scientist).

The 'injectables' referred to above notably would include the PRP technique and Actovegin. On the other hand, some high-level practitioners reflect upon the appeal of these techniques, and the reasons athletes will access them:

I: those people exist and appear to flourish within elite sports medicine and particularly within football. How does that happen?

R: Well, combination ... the power of personality; the ability to connect with athletes is something, I think, very few doctors have. So, those that do tend to succeed very well, they seem to have an understanding of sport, understanding of athletes, the ability to spend time, connect with them, actually have an influence over their thinking, which helps. If you get someone's confidence, they start to get better. And there is usually something to the treatment. So, if you do whichever *witchcraft* he lets you do, combine them with some kind of spinal epidural injection that reduces nerve tension, that's probably a long way towards getting people better. (UK orthopaedic surgeon).

And:

R: There are very few prized assets out there. If 10, 20, 30 positive reports come back from somewhere, people will go, people will fly to Ukraine to put a bit of placenta on their knee.

I: It was Serbia. Belgrade.

R: Was it Serbia? Wherever it was. They'll fly to wherever they feel that's a positive intervention. (UK orthopaedic surgeon above).

The above quotation refers to a well-publicised practitioner in Belgrade, Mariana Kovacevic, apparently a trained pharmacologist,

who provided treatments using a gel incorporating material from horse placenta. Unsurprisingly, the treatment attracted ridicule in some quarters of the popular press, and the sports medical professions. She has reportedly treated footballers including international stars such as Pablo Zabaleta, Vincent Kompany, and Robin Van Persie (https://en.wikipedia.org/wiki/Mariana_Kovacevic). The inaccuracy of the interviewee's knowledge together with the robustness of their view demonstrates the strength of this particular story as a point of reference in the orthopaedic community.

It is thus clear that these types of therapy attract a great deal of scepticism, though some support and commitment, from elite medical practitioners in sport. We now address the question of why such therapies and therapists attract enthusiastic users from elite sports, aside from the lure of novelty, corporate pressure to optimisation and a general societal move toward 'biocitizenship' (Cooter, 2008) as a form of identity.

6. The 'gravitational fields' of sports healer networks

It is apparent from the foregoing that the biomedicalisation thesis, even as it allows for corporatisation, contested evidence about biotherapeutic technologies' effectiveness and sports' quest for physical enhancement and the associated biologisation of identity, cannot account for the whole complexity of elite sports' therapeutic behaviours that we have illustrated. In particular, even though the biomedicalisation literature allows for pluralism, especially in the form of broad 'countertrends' (Clarke et al., 2010b: 14–20), elite athletes' and their medical advisors' beliefs about and access to novel biological therapies require further explanation.

We have seen above that word of mouth and personal contacts are important. The role of social networks in normal medical help-seeking has long been recognised in medical sociology (Freidson, 1960; McKinlay, 1973), and the concept of 'lay referral systems' (Freidson, 1960) or networks continues to be a useful one (e.g. Lee-Treweek, 2002; Schoenberg et al., 2003). The concept of networks has also been developed in application to sports, with the term 'sportsnets'. Waddington (2002) has reviewed development of this concept, noting that its originator (Nixon, 1992 and later publications) alleged that sportsnets operated to encourage acceptance of risk, pain and injury amongst athletes and insulate them from seeking public medical care (though later researchers presented contrary findings). In such networks, as Waddington points out, drawing on Freidson (1960), 'client control' (comparable here to 'player power') is more powerful than medical peer control over physicians. However, the weak position of traditional football 'club doctors' may not apply in the higher echelons of elite sport nowadays. Elite performers are enmeshed in networks of several different therapeutic disciplines, themselves mediating access to various orthopaedic, surgical and other specialists, as described above. The incursion of the sports sciences, sports massage specialists, 'strength and conditioning coaches' and physiotherapists, with their own claims to disciplinary power and authority, may also push against nonmedical pressures. Likewise, a recent survey showed how chartered physiotherapists in elite football are now more likely to oppose nonmedical club pressures than previously (Malcolm et al., 2015; Waddington, personal communication). Nevertheless, player power and word of mouth clearly remain significant.

These network concepts, while pointing to the role of referral systems selecting practitioners deemed to be trustworthy, do not explain why so many elite sportsplayers and performers and their advisors turn to apparently marginal medical practitioners and practices with such collective enthusiasm. In order better to understand this phenomenon, it is fruitful to consider the long tradition of research studies that have examined the association

between practices of healing and those of 'magic' in traditional societies. We do not seek here to engage in detail with differences between shamans, witches, healers, medicine men, oracles, sorcerers, witchcraft, leeches, diviners, and more, nor to attempt an overview of relevant studies. Rather, we point to certain studies and concepts that have sought specifically to understand the ways in which medicine and magic become connected and structurally embedded into the social fabric, used and believed in, and the social position accorded to medical-magical practitioners.

6.1. Scientific magic?

Interestingly, the possible role of faith, or magical belief, in the therapeutic efficacy of healers in contemporary medicine has not gone unnoticed by some contemporary practitioners in the elite sports field itself, as some of our football interviews revealed:

They have to have belief. And I've had a conversation ... about a player of ours who I have asked the manager if he can go and see a traditional healer, otherwise known as a witchdoctor in West Africa for treatment of a problem that he's got. And people would say, "Well, why on earth are you doing that? You're a scientific man." And the reason I'm doing it is because healing is more than simply science. It's founded in belief and belief systems ... there is a science behind it in terms of how you can look at the effects of emotion on sympathetic, parasympathetic nervous systems, you can look at effects of confidence and belief on performance. There's plenty of science which will show you that mood influences things like complex regional pain syndrome, which can have an effect on circulation and sensory change ... (EPL club medical lead).

Such discursive moves alluding to contemporary science might be regarded as a special case of what has been called 'assimilation' in early anthropological study: 'a magical or religious practice may have aspects which ... suggest therapeutic ... applications. In each case the relation of medicine with magic or religion is due to a process of *assimilation*, whereby an introduced practice has been endowed by the people who have adopted it with the features characteristic of their own culture' (Rivers, 1924: 56; our emphasis). So here, the club medical lead assimilates witch-doctor practices to scientific biomedicine (in a notably sophisticated manner here).

Although:

If somebody asked me to justify this as a football medical advisor, would I encourage people to start using witch doctors? I wouldn't want to enter that conversation because the Premier League wouldn't want me to do it. So in that role, I'm not going to start giving medical advice like that. But if he gets back fit and somebody says, "How on earth did you achieve that?" Then I would say, "What we did was we listened to the player's belief system." (EPL club medical lead)

Further, discussing an allegedly underperforming football player:

And if you listen to Usain Bolt talking about what makes him so fast, it is that he doesn't worry about it ... He says if he's worrying or thinking about something, that's when he injures because his biomechanics are different. He [the injured football player] generates so much power but the problem is the sequencing is wrong. And we know that that affects people so that can influence how people are feeling. So is that a biomechanical issue related to his sequencing of muscle function? Certainly, it's showing up on the GPS monitor but why is it

happening? - because it doesn't happen in the gym ... You take him outside and stick him on the grass and he can't do it. (EPL club medical lead)

This account implies that there is some 'psychological' or psychosomatic explanation for the athlete's lesser performance in matchplay. Likewise, traditional witchcraft beliefs emerged as a real concern with a football player who believed a family member, jealous of his sporting success, had put a spell on him:

I: What if his brother pays the witchdoctor to put another hex on him?

R: Well, I think that would bother him if he was getting recurrent injuries. But my feeling is that his recurrent injuries, at the moment, are the consequence of an inhibition that he has in terms of freedom of movement because we've dealt with everything else If you look at his isokinetics, so his ... measurements in terms of his power ... They're actually better than virtually everybody else in a similar position in the team. ... But he won't utilise it freely. (EPL club medical lead)

Some social anthropologists have highlighted the ways in which the legitimacy and authority of magical practitioners have been both linked to medicine and therapies, and established in their societal contexts. In seeking to describe practitioners who combined the magical and the medicinal, W.H.R. Rivers used the old English now outdated term 'leech', referring to 'a member of society whose special function it is to deal with the cure of a disease' (Rivers, 1924:5). In his research (in Melanesia) he noted that either religious or 'magical practices' might underlie the beliefs of different communities with such roles. Evans-Pritchard's famous account of the Azande (Evans-Pritchard, 1937, 1976) also sheds light on the linkage between magic and medicine. According to Evans-Pritchard, techniques using medicines were usually incorporated into magical ritual (Greenwood, 2009:99). He also paid attention to the position of witch-doctors in society; '... witch-doctorhood shows a degree of social specialization. This has its economic side, for a first-class witch-doctor is constantly being summoned to court or to the homes of affluent commoners ...' (Evans-Pritchard, 1976:115). Malinowski also referred to the 'personal prestige' and 'social power' characteristics of magical practitioners (1954: 85). Echoes of the elite position of sports medicine practitioners are clearly to be seen here.

Claude Levi-Strauss is pre-eminent in having produced a number of concepts, attempting to capture the community networks and powerful practitioners that our participants have related to us. 'Symbolic effectiveness' was introduced in his structural anthropology (1963). While the subject of some criticism (Neu, 1975), it nevertheless points to the interpersonal, culturally-embedded and emotional facets of medical practice:

... there is no doubt that the medicine man helps (the woman) by explaining and confirming, at some level, what they both think to be the cause of her ailment, explaining to her the development and what is done to help her, all in terms and a language understandable to the two of them. He also gives emotional support and wins her confidence. (Mjönes, 2010:23; our parenthesis).

Levi-Strauss's work in this field above all points to the ways in which extra-ordinary healing powers attributed to certain individuals are fundamentally supported by processes of sociocultural community: 'collective belief is seen ... to sanction and guarantee the sorcerer's power'. Levi-Strauss himself analysed this

shared sanctioning of the sorcerer's power as based on three principles:

There is, therefore, no reason to doubt the efficacy of certain magical practices. But at the same time we see that the efficacy of magic implies a belief in magic. The latter has three complementary aspects: first, the sorcerer's belief in the effectiveness of his techniques; second, the patient's or victim's belief in the sorcerer's power; and, finally, the faith and expectations of the group, which constantly act as a sort of *gravitational field* within which the relationship between sorcerer and bewitched is located and defined. (Lévi-Strauss, 1963a: 168, our emphasis).

Levi-Strauss also conceptualised this threefold dynamic as a 'shamanistic complex' (Lévi-Strauss, 1963b: 179).

Taken together therefore, we can note in these classic accounts and their more recent expositions several aspects of traditional societies' magico-medicine practices that can help us understand elite sports' recourse to unusual, innovative therapeutic providers. In particular, we note aspects of religion or faith, the importance of the social position conferred on practitioners by users, the personal relationship between practitioner and shaman or witch, and sometimes the role of wealth in enabling access to the practitioner.

Lest we fall into the once common trap of attributing irrationality to 'belief in' magical powers (cf. Horton, 1993; Hunt and Mattingly, 1998), we should note that, as Johnson has commented: 'belief in the magical is not a simple affair ... such belief does not exclude a degree of scepticism ...' (Johnson, 2003: p78). Levi-Strauss himself posed the question: 'how much credulity and how much skepticism are involved in the attitude of the group toward those in whom it recognizes extraordinary powers, to whom it accords corresponding privileges, but from whom it also requires adequate satisfaction?' (Lévi-Strauss, 1963a: 168). Indeed, medical anthropologists have been 'vexed' by the question of the efficacy of 'traditional' medicine, with a more recent nuanced recommendation being that efficacy should 'be seen as fluid and shifting, the product of a negotiated, but not necessarily shared, understanding by those involved in the sickness episode' (Waldram, 2000: 603). Some recent medical anthropology has also advocated a positive interpretation of the possible 'efficacy' of symbolic aspects of treatment in medical contexts. Young (1979) distinguished three realms in which the efficacy of 'traditional medicine' could be seen to 'work': the empirical, the scientific, and the symbolic (cited in Waldram, 2000). And, for example: 'The healer's strength lies in providing symbolic treatment which can affect renewal of behavioural capacities and restoration of the patient's subjectively perceived state of health ...' (Finkler, 1985:37).

In summary, while we do not take a position on the relative efficacy of the unusual bio-therapy practices and therapists' behaviours that we discuss, the anthropological understanding of medicine's relation to faith, belief, magic and religion, and the social positioning and legitimation of such practices in traditional societies, offers insights that can assist us in understanding the contemporary behaviour of elite athletes and their advisors and organisations who access controversial bio-therapies. They also build on the foundations of the primary strands of the biomedicalisation thesis.

7. Conclusion

Given the emergence of a far-reaching 'Sports Biomedical Industrial Complex', can we paradoxically but reasonably understand the medical gurus of elite sport or its popular but controversial therapeutic practitioners as modern shamans? Our analysis shows a significant gap between bio-scientisation and biomedicalisation

of elite sport on the one hand, and informal, trust-based, reputation-based, and – at times - faith-like patterns of referral to practitioners with attributed powers on the other. The latter category notably includes both elite surgeons as well as medically controversial figures stereotypically deemed 'snake-oil salesmen' and 'witchcraft' by members of the evidence-informed sports-medical establishment. The core strands of the biomedicalisation thesis can account for some features of the contemporary therapeutic experience of elite sports practitioners, but although its application admits of countertrends it does not directly conceptualise the exceptional, biological therapies, which we have argued that a perspective of societally-endorsed 'magic' can grasp. There have indeed been few analyses that have identified a role of magic in sports medicine. Carter (2010) showed an anti-professionalising trend of using unorthodox treatment methods (such as hot towels for hamstring injuries) appearing in English football from the 1930s onward, though the 'magic sponge' of physiotherapists is shown to be largely a creation of the post-war mass media, not connected to magic in the anthropological sense. More pertinently, Malcolm (2011) pointed to 'magical-mythical' or folk knowledge and thinking surviving in spite of the scientization of sport. Most relevant to our own analysis, Malcolm noted the coexistence of different forms of therapeutic knowledge and suggests that this 'in some cases underestimates the sophistication of contemporary sports medical practitioners in juggling different therapies with contrasting, weak or absent underlying scientific bases/paradigms' (2011). Our data discussed above support this and add to it by showing instances of the assimilation of contemporary scientific understandings with belief-based magic or witchcraft. However, unlike Malcolm we do not agree that sports medicine may 'wield greater influence as the role of superstition and tradition decline in elite sport' (2011:299). Rather, our evidence suggests that 'superstition and tradition' (magic and faith-related practices) are likely to continue to be just as significant.

As this discussion has shown, in elite sports, the therapeutic context is both a local and a global one. While the biomedicalisation thesis was developed in the U.S. context, it clearly has purchase in our case of the U.K. and beyond. The globalisation of sports labour in sports like professional cycling and football challenges contemporary elite sports medicine. To be sure, the international journeys of elite sportspeople seeking the quickest healing solutions have some echoes of the recent phenomenon dubbed 'medical tourism', and 'stem cell tourism' in particular. These hopeful journeys share some of the characteristics of faith-based 'pilgrimages' (Song, 2010). Applying contemporary global biomedical expertise in the context of athletes' and sports organisations' overwhelming desire to return from injury must be set in the context of the ability of practitioners of novel, innovative and alien techniques to engender the faith and trust of elite athletes and their medical and nonmedical guides. Not only do we observe recourse to avowed traditional healers from various cultures globally, but there are also patterns of athletes' access to emerging state-of-the-art and controversial biological therapies that can validly be described as magical, or faith-based, in the same way. The latter group of therapies and therapists comprises the polar opposites of on the one hand practitioners seen as marginal to the mainstream, and on the other of those seen to be at the apex of mainstream evidence-based practice, especially in orthopaedic surgery.

We have pointed to several features of magic, shamanism and witchcraft in traditional societies that are analogous to, and give us an insight into, the behaviours of some elite sports medical practitioners in placing faith in and seeking novel bio-therapeutic remedies for injury. We have not, however, probed the underlying reasons for this, aside from institutionally induced pressure, and the desire to 'return to play'. Malinowski (1954) inquired into

'the situations in which we find magic', listing a range of experiential gaps and uncertainties and including 'the healthy person (who) suddenly feels his strength failing'. We can surmise that the uncertainties of injury and alternative remedies figures in this way in elite sport's collective turn to extreme practitioners and therapies. Likewise, we have not sought to compare the two sports studied. Our data are stronger for football than cycling, though both appear susceptible to the same analysis. Whether there are sport-specific aspects in other elite level sports is an open, and interesting, question.

In many countries 'traditional' medicine and scientific biomedicine co-exist for the mass of the population, and the traditional practice of magical medical actors such as shamans may even be increasing, for example in Mexico (Cassard, 2007). This co-existence of entirely different therapeutic paradigms has been dubbed 'medical pluralism' (Goldstein, 2004). In the case examined, here, however, although we observe aspects of help-seeking that fit the 'traditional medicine' model, such as faith-based behaviours and the importance of interpersonal referral networks, we also note that the bio-therapy techniques we have discussed are not themselves 'traditional' at all. Most are not accommodated easily into notions of 'complementary' or 'alternative' medicine, nor the accepted realm of modern scientific medicine. As a footnote to our analysis, therefore, we suggest a need to extend the notion of medical pluralism to accommodate such novel, non-traditional, non-mainstream biomedical techniques and their practitioners, where the biomedical and the magical are combined in the same therapeutic offering. We should, at the least, begin to understand the medical 'pluralism' phenomenon not merely as one of different paradigms co-existing, but as one in which magical belief can apply across folk, conventional medical and innovative biotherapeutic paradigms.

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