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Infrastructure & Expertise: A Model to Investigate Effective Training through Long-term Athlete Development

Project Summary

A Hockey Intervention Program (HIP) was established as an innovative vehicle to evaluate the infrastructure-athlete relationship for training athletes in the sport of ice hockey. This research examined both system level and athlete level factors that influence stakeholders' decisions to access and/or integrate infrastructure into athlete development and how innovative infrastructure can best provide effective support for athlete development throughout the stages of Long Term Athlete Development (LTAD). The HIP coupled facility time (hard infrastructure) in the form of a sport specific training device (skate treadmill) emphasizing fundamental skill development and expertise (soft infrastructure) in the form of highly qualified and specialized trainers. Outcomes of the research strongly supported the value of sport specific infrastructure programs, such as HIP, which focused upon fundamental skill acquisition and development at all stages of LTAD. Simply stated, fundamental skills, such as skating, are rudimentary to the sport and the mechanics can and should be introduced, taught, trained and mastered at all levels of player development.

Research Methods

This study employed a mixed-method research design to examine the impact of the HIP according to two perspectives. First, system-level qualitative data regarding when, how and why sport infrastructure is most effective in supporting athlete development was gathered from four hockey sub-system stakeholders – parents, coaches, minor hockey leaders, and hockey talent scouts/agents. These groups have vested interests in athlete development and as such, make decisions that directly influence the type of facilities and expertise an athlete utilizes. Open-ended surveys and interviews provided data on stakeholder attitudes about the role of both hard and soft infrastructure in supporting athlete development.

Second, athlete-level quantitative data was gathered to examine how the HIP contributes to athlete development and sport specific performance. Physiological, biomechanical and on-ice performance measures were tracked pre and post a 12-week HIP training intervention per year for two years. Biomechanical measures assessed change in mechanical skill acquisition and refinement of technique, physiological measures assessed change in fitness level, and sport-specific performance measures assessed the transference of dry-land training to on-ice performance.

These data – stakeholder attitudes and performance measures – were analyzed and interpreted both independently and compiled in order to determine how stakeholders access infrastructure in ways that provide the greatest amount of support for athlete development. All data was collected on a yearly (cross-sectional) and ongoing (longitudinal over two years) basis to track system and athlete changes. This approach and timeline also facilitated the development of practical recommendations as outlined below.

Research Results

System level qualitative data was collected from 160 stakeholders; 120 parents and 40 decision makers that act on behalf of a minor hockey player. One parent for each athlete was surveyed with the exception of those 20 athletes in the “Active for Life” stage of LTAD; as adults making their own decisions, these athletes were surveyed directly. The remaining stakeholder groups included a random distribution of coaches, league administrators, scouts and agents. System level qualitative results emphasized support for three themes: the reasons for accessing sport specific infrastructure, the timing of ‘first access’ of sport specific infrastructure, and the quality or ‘perceived impact’ of facility time and expertise associated with sport specific infrastructure exposure.

Athlete level quantitative data was collected from an athlete sample of 140 hockey players; 20 athletes for each of seven stages of the LTAD model. Analysis revealed three themes consistently across all stages of LTAD: significant pre-post differences in mechanical literacy; confidence; and physical literacy gained as a result of exposure to HIP.

Combining and interpreting both qualitative and quantitative findings has provided a framework to assess the sport infrastructure-athlete connection. The greatest influence in understanding sport specific infrastructure and expertise occurred in Year 1 of the HIP when the novelty and impact of the program was high. Participants and stakeholders recognized the benefits of HIP early in an athlete’s development and the influence of an integrated approach to mechanical and physical literacy seen consistently throughout the stages of LTAD. While this study focused specifically on ice hockey, research outcomes strongly support the value of sport specific infrastructure programs which emphasize the acquisition and development of fundamental skills, such as skating mechanics, as a part of athlete development at all stages.

Policy Implications

Where enhancing sport participation is concerned, this research project has three major implications:

- 1) Alternative infrastructure (e.g. Skate treadmill training) is as an effective way to teach, learn and train “FUNdamentals”

The Canadian Sport Centres have called skating one of the “FUNdamentals” of LTAD in on-ice sports.¹ As noted above, most ice hockey stakeholders believe that even young children, given quality instruction, can acquire confidence and learn proper skating mechanics and technique on the skate treadmill.

- 2) Skate treadmill training as an alternative to scarce and expensive ice time

Several interviewees noted that ice and ice time are scarce commodities in many communities. One of the advantages of the HIP is that it is the only off-ice mode of training that allows actual skating, thus circumventing the need for ice and ice time. Additionally, skate treadmills are considerably less expensive to build and maintain than ice surfaces, and take up far less space. As a result, skate treadmill training can be an attractive solution to issues associated with access to ice.

- 3) The need for accreditation/certification of instructors

One of, if not the, major benefit of the HIP noted by stakeholders was the skating-related knowledge and expertise of HIP instructors – knowledge and expertise that is necessary to benefit from the training of what Hockey Canada calls the most important skill in ice hockey². Related to this, several stakeholders mentioned the range of instructor quality associated with the “plethora” of commercial hockey training resources that exist today. Many suggested a need to accredit or certify instructors so

that all stakeholders can have confidence in, and benefit from, available coaching and instruction. Both the Ontario Minor Hockey Association³ and Hockey Canada⁴ emphasize the need for certification and continuing education of coaches.

Next Steps

Results of this study support the development of fundamental movement patterns or mechanics of motion beyond the Active Start and FUNdamentals stages. Mechanical literacy has the potential to significantly enhance sport performance at all stages of development if integrated appropriately. It is recommended that a model of mechanical literacy be built and superimposed on the current model of physical literacy throughout all stages of LTAD.

References

- 1) Canadian Sport Centres. (2006). *Canadian Sport For Life Through Long Term Athlete Development: Resource Paper V2*, p. 21. Retrieved September 29, 2010, from <http://www.canadiansportforlife.ca/upload/docs/LTAD%20Downloads%20Eng/Canadian%20Sport%20for%20Life%20Resource%20Paper.pdf>
- 2) Hockey Canada. (2008). Long Term Player Development Plan. p. 12.
- 3) Interview with OMHA administrator.
- 4) Hockey Canada. (2008). Long Term Player Development Plan.