Implementation and Evaluation of a Futures Program in Youth International Ice Hockey

Background

In the competitive landscape of professional ice hockey, there is significant pressure for National Ice Hockey Federations to select and develop athletes to the senior elite standard. How limited resources are strategically used by talent systems has become a key issue in practice. Reflecting this, the best young players across clubs and contexts are selected to engage in well-resourced national Talent Development (TD) programmes (e.g., national emerging talent programmes, ice hockey high schools, youth international teams). The selection of young players into national TD programmes often occurs at young ages, with some Ice Hockey Federations selecting players even before puberty. Those selected typically receive professional coaching, sports science and medical support, access to superior training equipment and facilities, and exposure to increased levels of competitive challenge when compared to non-selected peers. The selection of the highest potential players into such national TD programmes is proposed to facilitate their long-term progress and increase the probability of senior success. Conversely, athletes who are not considered to show sufficient sporting promise at the time of selection are not recruited into these selective pathways and are denied access to such opportunities.

One factor that has been extensively examined in the literature as influencing selection and development dynamics for young players is biological maturation (1). Biological maturation is the process of progression toward the mature adult state and can be defined in terms of status, timing and tempo. Maturation status describes the state/stage of maturation that the individual has attained at the time of observation (i.e., pre-pubertal, pubertal, post-pubertal); whereas timing refers to the chronological age at which specific maturation events occur (1). Youth of the same chronological age can vary substantially in their status, timing, and tempo of maturation. From late childhood, same age peers have been shown to vary by as much as five-to-six years in skeletal age and somatic maturity (2), both of which are established indexes of maturation status in youth.

Rationale

Ice hockey is physically demanding and requires anaerobic power, frequent intermittent acceleration and deceleration, with games involving frequent physical contact and collisions (3). As biological maturation is associated with an increase in muscle mass, anaerobic power and oxygen uptake, early maturation may be particularly beneficial in physical sports such as ice hockey (4). Research has consistently shown that 14 to 16-year old male players selected in ice hockey try-outs are more mature, physically larger, and more athletic than unselected players (5). This selection bias is further evidenced by recent retrospective register studies from Swedish high school ice hockey academies, which demonstrated that U16 and U18 national teams consisted predominantly of early maturing players, while the U20 national team showed a more even distribution between early, on-time, and late maturing players (6).

Early maturation elicits numerous physiological, physical, and functional advantages that transfer directly into performance environments. Early maturing youth generally benefit from increased lean muscle mass, the ability to reach faster speeds, greater endurance, and increased muscular strength and power relative to their later maturing peers (1,7). In ice hockey contexts, there are concerns that early maturing players may rely on these physical and functional advantages to the neglect of their psychological and/or technical and tactical development (8). While the former may lead to short-term performance advantages, the latter have been highlighted to be central to long-term development.

Late maturing youth are, therefore, more likely to be overlooked or excluded from talent pathways, thus denying them access to the specialist coaching, training resources, and high levels of competitive challenge that are typically associated with elite development systems. Although there is evidence to suggest that late maturing athletes are proportionally more likely to progress to the adult level than early maturing athletes if retained in the system (6), late maturing athletes are likely to remain underrepresented at the adult level in absolute terms due to a smaller initial representation within the development system.

Proposed Research

Building on successful implementations in football (soccer) (9,10), we propose to investigate the implementation of a novel "Futures" program in youth international ice hockey, specifically focusing on U16 teams in Sweden and Finland.

The implementation of Futures programs in football has demonstrated remarkable success, particularly in Scandinavian countries. Both Sweden and Denmark have documented many cases where players initially selected for Futures teams have progressed to their respective senior national teams. These programs run parallel to the traditional U16 national teams, providing late-maturing players with equivalent international exposure, high-level coaching, and competitive opportunities. This dual-pathway approach has proven effective in retaining talented late-developers within the national team structure who might otherwise have been lost to the system. The success of these programs in football provides a compelling precedent for adaptation to ice hockey.

If implemented in ice hockey, this program would enable opportunities for late-maturing players to be retained within the national system and experience training, competition, coaching, and international travel as part of a national team. Crucially, selection would still be based on players being identified as technically, tactically, and psychologically capable of competing at the international level.

Research Objectives

1. To implement and evaluate a Futures program for late-maturing U16 ice hockey players in Sweden and Finland

2. To assess the experiences of selected players through both qualitative and quantitative measures
3. To collect and analyze objective performance data from matches
4. To follow-up (long-term) developmental trajectories of Futures program players with those in traditional national team programs.

Methodology
The study will employ a mixed-methods approach including:
- Screening of players at regional camps to identify late-maturing talented ice hockey players for selection to a Futures national team in Sweden and Finland
- Anthropometric and maturation assessments (Khamis Roche method)
- Semi-structured interviews with players and coaches
- Comparative match metrics analysis

Expected Outcomes
This research will provide the first empirical evaluation of a Futures program in ice hockey, potentially offering a model for other nations to follow. The findings will contribute to our understanding of talent development in ice hockey and provide practical recommendations for addressing maturation-related selection biases in youth ice hockey.

Of particular importance, this research could provide valuable insights for smaller nations with limited resources. By demonstrating how to effectively identify and develop late-maturing players, the Futures program model could offer these nations a cost-effective strategy to maximize their talent pool and compete more effectively on the international stage. Rather than potentially overlooking talented late-developers due to resource constraints, smaller nations could adopt modified versions of the Futures program to ensure they capitalize on all available talent, thereby increasing their competitive capacity in international ice hockey.

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