FROM TELEMARK TO CARVING

OD TELEMARKA DO KARVINGA

Nikola Stojanović[1], Zvezdan Savić[1], Vlado Stijepović[2] and Ljubiša Lilić[3]

[1]The Faculty of Sport and Physical Education, University of Niš
[2]Serbian Association of Snowsports Instructors, Belgrade
[3]Faculty of Sport and Physical Education, Leposavić

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Correspondence author:

Assistant Prof. Nikola Stojanović , Ph.D.
University of Niš
Faculty of Sport and Physical Education
Čarnojevićeva 10a
Niš, 18000
Serbia
www.fsfv.ni.ac.rs

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SUMMARY

Skiing belongs to the group of specific cyclical sports which include the learning, improvement and realization of different motor skills and activities, and as such is inextricably linked to snow-covered terrain at higher altitudes. The exact time when skiing was first invented is unknown, but what is known is that its development throughout history was complex, both in terms of skiing equipment and in terms of technique. The first skis date back to the ice age, 4500 BC, and were of various length, weight and width. Only one ski pole was used. Telemark and Christiania skiing were the basic skiing techniques of turning and stopping which are still being developed and improved to this very day. The position and stances of the skiers have undergone changes and are closely related to ski design and the design of the accompanying equipment. Longer skis of various lengths have been replaced by two shorter skis of the same length, modern automatic buckles, deeper and sturdier ski boots and two shorter identical poles. Competitive skiing has developed and changed in accordance with the requirements of the competition (the carve turns, the length and radius of the skis, their shape, size, the number of and distance between the poles, the quality of the skiing surface, differences in elevation along the ski slope, etc.). A short, heavy and rigid ski was replaced in the 1960's by a more narrow and longer ski, only to be replaced once again during the 1990's by a shorter, more lightweight and wider carving ski. New technological challenges facing the ski industry are once again bound to the more narrow, lightweight and faster skis, but also to the combination of shorter and longer skis which are used in beginner training. Thus, this research deals with the historical representation of current techniques and professional and technical practices in skiing, but also the predictions of future trends in the development of Alpine skiing.

Key words: *skiing, trends, skis, mechanics, development.*

INTRODUCTION

The first record of skiing originates from the regions of what is today known as Norway. It is well known that ancient hunters some 4500 years ago used long and heavy skis to help them navigate their way through impassable, show-covered terrain (Lund, 1996). This period was marked by the emergence of larger societies, a consequence of people's decisions to permanently settle in areas which offered them the possibility to experiment with the cultivation of various plant cultures, which were later considered a staple part of their daily diet. The formation of permanent settlements enabled people to improve and enhance their skiing skills for various purposes. We cannot with any certainty conclude whether people at this time used skis to descend slopes, but their use was gradually becoming more and more frequent. However, we certainly cannot conclude that the origins of skiing should be associated with this period of time. Skiing, in the full sense of the word, occurred much later is only approximately one thousand years old. It is linked to the life and times of the Viking king Harald Hadrada (1046-1066), who promoted the skill of fast skiing as a fun activity aimed at winning and proving one's physical abilities. "Norwegian" skiing achieved its full expansion thanks to mountain farmers, that is, the first Telemark skiers of the Telemark valley, some 80 km from Oslo. The Swedish bishop Olaus Magnus published the book "History of the Northern Peoples" in 1555 in which he described the use of skis for hunting, as well as in competitions held for prizes. The individual most deserving for the affirmation for Telemark skiing was Sondre Norheim (Lund, 1996). His greatest accomplishment was the fact that he made the revolutionary discovery which heralded what are today known as Telemark buckles. Even though, various types of material had been used until then to fasten the foot of the skier to the ski boot, the difference lay in the fact that Norheim's buckle was made of interwoven elastic tree roots. This contributed to the better fastening of the feet to the skis, which directly influenced the development of specific skiing techniques, later known as the Telemark and Christiania techniques (Lund, 1996). In middle Europe skiing was mentioned for the first time in the book of the historian Johann Weikhard von Valvasor "Glory of the Duchy of Carniola" published in 1689 (Kotnik, 2007; Živanović, Savić, Milojević & Milutinović, 2003). The book describes how the Slovenian peasants residing in the region of the mountains of Bloka used their skis solely to make their way around the mountains, and are thus considered the first skiers in the region of middle Europe (Živanović, Savić, Milojević, & Milutinović, 2003).

With the emergence of the carving technique, the development of skiing underwent its full expansion, especially since almost all the differences between recreational and competitive skiing were blurred. Carving as a skiing technique enabled both competitors and recreational skiers to have more stability and to ski much faster on the edges of their skis. In the mid-1990's, more precisely in 1997, a new model of carving skis was designed, whose geometry has persisted to this day. The emergence of carving skis enabled the skier to make a precise turn with their skis, leaving a sharp and clear trace. The fact is that the short, heavy, rigid skis of the 1960's were replaced by more narrow and longer skis, only to once again be replaced by the shorter but more lightweight carving skis in the 1990's. The new technological challenges faced by the ski industry are related to designing more narrow, lighter and faster skis, but also to the combination of shorter and longer skis which could be used to teach beginner skiers.

METHODS

The aim of this paper is to use a historical method of analysis to evaluate skiing practices to date which have directly initiated new trends in the development of Alpine skiing. The historical method represents the basic method of research in historical methodology, which was primarily used in historical research. However, this method can be used in the research as a part of social and natural sciences and as such could be applied in one of the basic research methods in the field of the history of physical education (Savić, 2016). The paper relies on both the historical and descriptive method.

DISCUSSION

New skiing techniques, especially in competitions, are conditioned by the changes in the material which is used to build new skis. The evolution of the Alpine skiing technique increased the demands on the manufacturers of ski equipment to provide a better bond between the skis and skiers. Skiing as a competitive sport began to develop only much later. The first competition in ski traversing and the downhill slalom was held in Christiania (what is today the city of Oslo), where the first ski club was founded. On the occasion of this competition, in 1767, the first ski rules were written. The Telemark region of Norway greatly contributed to the development of competitive skiing. It was precisely there that the brothers Nordheim at the end of the 19th century changed the shape of skis and the buckles. The front and back part of the skis became somewhat wider, and vertical shallow ridges were added to the slick sole so as to enable better control of the direction of ski movement. They were also proficient in the curving technique and stopping technique, which facilitated their movement on skis. The downhill slalom technique, that is, the downhill with poles event emerged at the end of the 19th century, and was first demonstrated by Arnold Lunn. Lunn himself took none of the credit, and instead named Clofield the father of the idea, at the same time being careful not to diminish the influence of Zdarsky, who was a pioneer in invention of a new curving technique, and Schneider, who perfected it (Lunn, 1940). Hannes Schneider is thought to be the father of the revolutionary Arlberg method, which represented the first formalized method of ski training, including movements that ranged from a snow plough turn to a parallel (Corrocher & Guerzoni, 2009). In addition to the slalom, the downhill was also a very popular discipline. The most popular among these competitions was the Challenge Cup organized by Robert of Kandahar, named after the famous British general Frederick Roberts, who led the first great march in Afghanistan, from Kabul to Kandahar (Kennedy & Nicholls, 1981). It is an interesting fact that Roberts himself was not a skier, nor he had ever visited the Alps. The explanation for this can be found in the extensive Victorian sense of patriotism of the time. The popularization of Alpine skiing was considerably promoted by the famous English author Sir Arthur Conan Doyle, the creator of the eccentric detective Sherlock Holmes. In 1894 he crossed the track from Arosa to Davos and published his escapades for posterity in an article in the Strand Magazine, which might be considered the first newspaper account of skiing (Carr, 1975). Competitions were only beginning to be held on organized terrains, and only the beauty of the act of skiing was ever evaluated. In the beginning of the 20^{th} century, artificial obstacles began to be placed on the slope, which were later replaced by thin flexible poles with flags on them. Some time later, a change occurred in the shape of the gates which has remained unchanged until today and gives a common name to this discipline – the slalom. This in turn changed the way in which skiing evaluated. It was no longer the beauty of the run, but instead the time it took to complete the obstacle course along the slope.

This claim is supported by the fact that the technique in the slalom discipline often changed. In addition, one of the main reasons why there was a constant need to improve one's technique was the emergence of flagpoles which allowed the skier to pass through the gates in a completely new fashion (Savić, 2016). All of these changes led the ski schools of the time to change the course of their development, that is, they were forced to adapt to new trends. With an increasing number of competitors all over Europe, there was an increase in the number of new organizations being founded. The first ski associations were founded at the beginning of the 20th century in Switzerland and Germany, along with the ski union of central Europe. The first international ski congress was held in Christiania (Oslo) in 1919. During the first Winter Olympic Games in Chamonix in 1924, the first International Ski Federation was founded *Federation internationale de ski – FIS (Kotnik, 2007)*. Arnold Lunn was given that great honor of being the principal organizer of the first FIS championship in Murren in 1931. (Holt, 1992).

When we look at skiing from the viewpoint of the development of skiing techniques, we can conclude that several different ones are clearly discernible: the Lilienfield, Arlberg, the French rotational, downhill, the Avellment, Jet, balanced skiing without poles, Carving (Jabučanin & Đurović, 2011).

Mathias Zdarsky adapted Nordic skiing and skis to the Alpine terrain. He invented adequate metal buckles which were at the time also known as Lilienfield buckles. He used a long pole to push off and maintain balance (Živanović, Savić, Milojević, & Milutinović, 2003). Zdarsky is considered to be the founder of the snowplough turn. This specific skiing technique is referred to as the Lilienfield technique. Zdarsky was thought to be a great admirer of skiing, and that was probably why he was the first and last Austrian who did not request any monetary compensation for his ski instructing skills (Lund, 1996). On the other hand, Georg Bilgery perfected the skiing technique, which was a "blend" of the Lilienfield and Nordic technique, adapted to suit the Alpine terrains (Živanović, Savić, Milojević, & Milutinović, 2003). Unlike Zdarsky, Bilgery used two poles instead of one to increase a skier's stability. Also, he improved the Lilienfield buckles, which enabled him to improve the current ski technique of the time.

Hannes Schneider was the first professional ski instructor who is considered to be the father of the "revolutionary" Arlberg technique. The basic of this skiing technique was the snow plough turn, to the parallel Christieand the parallel turn. What set Schneider apart from the rest of his predecessors and contemporaries was the introduction of a formalized and methodical training in ski techniques. He provisionally divided the learning process into mutually related wholes, where certain elements of the ski technique were acquired following the principle of an "ascending pyramid", that is, from the simpler ones to the more complex. The basic aim of this approach was to more quickly and efficiently learn ski techniques, for which the training period was significantly reduced. Apart from that, the efficiency and economic nature of the movement, characteristic of the Arlberg technique, enabled an increase in the ski speed, which was especially important for the development of competitive skiing. However, the French school of skiing, with its leader Emile Allais, were staunch opposition to the Arlberg school, considering it too excessive for the turn to begin and end with a snow plough. They believed that a skier from a downhill position should glide and with a turn towards the slope to change the direction of movement. In addition, as is characteristic of this technique, the center of gravity is removed towards the tips of the skis, and when there is a change in direction of movement, the pressure on the back end of the skis is released, so that the movement reminds us of a bucking motion (ruade) (Guido, 1982; Živanović, Savić, Milojević, & Milutinović, 2003).

By mixing the French and Austrian school of skiing, a new technique was founded which increasingly more resembled the modern one, and its founder was Stefan Kruckenhauserfrom

Kitzbühel. He first presented his innovation at the international congress of ski didactics Interskiin 1955 in Val d`Isère (Guido, 1982). It was an accepted fact that turning the body in the direction of the turn was not practical, and that it should be replaced by a turn of the body in the opposite direction to that of the movement of the skis and legs, which enabled a more evenly distributed pressure along the entire ski, as well as an increased stability during the performance of a turn.

Ski equipment also underwent certain changes. The earliest buckles in Alpine skiing did not enable the release of the boots in the case of a fall (Ettlinger & Johnson, 1982). In the 1920's and 30's the ski boot was fastened to the ski with the help of a long cable or a leather belt, which provided the skier with better control of his skis, but due to the inability to release the boots, the skier ran a high risk of injury during a fall or in various situations involving a turn when the influence of force on the skeletal-joint structures increased (Shealy, Geyer, & Hayden, 1974). In the following years, a new buckle was designed which had the ability to release the heel, and not the toes. It was only after 1950 that the first buckle with a release mechanism was designed, based on the same principle that modern buckles operate on today (Natri, Beynnon, Ettlinger, Johnson, & Shealy, 1999). Due to the strong urge to make ski technology more effective and faster, the production of ski buckles was constantly improving, while the construction of skis remained relatively unchanged. Only the greater expansion of ski centers and the construction of ski lifts inspired a series of inventions in ski design. The most innovative idea was the placing of steel rims by an unknown Austrian metal worker in 1928 (Corrocher & Guerzoni, 2009), that is, Harry Oswald Carr in 1932, according to the patent documentation (Carr, 1932), which significantly contributed to the development of ski techniques. With the increase in the ski speed, skis which were built out of a single piece of wood, could not meet the new demands. The production of a complex multi-layered ("laminate") ski in 1939 along with the invention of more effective glues, enabled greater resistance to torsion, which increased the effectiveness of the turn at greater speeds. By 1951, 90% of the manufactured skis were "laminate" (Clark, 1985). Howard Head patented a ski made of composite wood and metal, with a plastic bottom in 1954, which contributed to the development of skis made of "fiberglass" (Head, 1954), which are characterized by their resilience and significantly smaller vibrations at great speeds. By the end of the 1960's, "fiberglass" skis almost completely replaced "metal" ones. In 1990, the Salomon company launched a ski with a single-part plastic "cap" on the tip and sides (Diard & Guers, 1990). At this time skis ranged from 175 to 210 cm in length, and their width was even from beginning to tend. A very important breakthrough in the design of skis was made by the companies Kneissland Elan, which constructed a prototype of a modern carving ski at the beginning of 1990. Due to their wide "tips" and "tails" and narrow "waist" and length of only 160 to 180 cm, these skis were primarily constructed for beginners, since they offered the possibility of an easier turn as the skis would roll onto one edge during a turn. Very soon the competitors also saw that it was much easier to manipulate these skis than the traditional ones, and that at the same time they were more stable when performing a turn at greater speed. The new carving skis very quickly swept through the market and became the standard for all manufacturers of ski equipment (Corrocher & Guerzoni, 2009). In 2012 almost 100 percent of all the skis sold on the market were carving skis (Corrocher & Guerzoni, 2009).

When we view the problem through the prism of competitive and recreational skiing, where competitors tend to ski down the slope at maximum speed, following the ideal – shortest path, in as fluid a manner as possible, without extensive effort or exertion, we can undoubtedly conclude that the modern carving skis have met all the requirements. The entire history of Alpine skiing was focused on change and improvement in technique, with alterations in ski equipment. The tendency was to enable the competitors to achieve maximum speed, and the recreational skier's complete security, that is, comfortable and

quick learning, and thus maximum enjoyment of the snowy slopes with a simple, easy to learn means of achieving the skill of skiing.

The carving skis are specific in terms of appearance, of different geometry in comparison to the traditional skis, wider and significantly smaller in length. With these significant changes, it was easier to ski and to maneuver, so the training of future skiers was adapted to suit the new ski geometry, and the skiers were made to adapt to new situations surrounding skiing more efficiently and more quickly. Carving skills today also help recreational skiers to ski relying on approximately the same technique as competitors. Of course, there is a big difference in the technique in performing the turn, but a properly performed turn enables a unique sense of skiing. Even though the "first" model of the carving skis was presented in 1997 (Elan company, Begunje, Slovenia), the idea originated much earlier. By analyzing the patent documentation, we found a certain patent which was granted in 1950 (Louis, 1950). The author points out that the basic idea behind this patent is for the skier not to be burdened by constantly guiding the skis, because the skis with their geometric make-up will be able to provide greater resistance and adhere more closely to the surface of the snow. This enables the skis to be more stable during the performance of a turn with a small radius when compared to more conventional skis. Furthermore, the authors Droste and Strotmann very vividly described the "structured" Telemark skis in their book, which were still being produced until 1940. According to these authors, the designer of the first carving ski was Sondre Norheim, who was quite ahead of his time with his radical ideas (Corrocher & Guerzoni, 2009; Droste & Strotmann, 2003).

CONCLUSION

Finally, it is clear that as early as the end of the 19th and the beginning of the 20th century there was great enthusiasm for the development of skiing. This of course included that the development of ski techniques, whose pioneers included Sondre Norheim, Mathias Zdarsky, Arnold Lunn and Hannes Schneider, and which had to develop at the same time as the ski industry, without which skiing as a sport and the recreational activity of many would certainly not be where it is now. The design of the first Telemark buckle provided unity between the body of the skier and the skis, which led to a greater stability and was the first precondition for the immediate development of the ski technique. The design of a buckle with a release mechanism reduced the risk of injury. The skis themselves also underwent significant changes, from skis made out of a single piece of wood, to those made from various composite materials, which contributed to the greater stability and smaller vibrations of the skis when making a turn at great speed. With the launch of the carving skis, skiing underwent a true revolution. Carving skis enabled each skier better control of the turn in various conditions and at various speeds. On the other hand, the training of beginners was significantly reduced and made easier, so that almost anyone could master the carving turn, which contributed to a greater enjoyment of the skiers and thus led to the increased popularity of skiing. Skiers in the Alpine disciplines achieve great speeds on various types of terrain which requires quick and forceful adaptation. Moreover, skis also function as levers, and in the best sense could represent an extension of the muscle-skeletal system of the body, and in the worst case, a mechanism which could trigger numerous sports injuries. We assume that future trends will lead to the development of equipment which will be as efficient and economic as possible, and which would allow skis to become more popular. Having said this, we are of the opinion that skis will be narrower, more lightweight and faster, which will undoubtedly contribute to better competitive results but also enable recreational skiers greater enjoyment.

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SAŽETAK

Skijanje spada u specifične ciklične sportove koji u sebi sadrži učenje, usavršavanje i realizaciju različitih motornih veština, radnji i kao takav je tesno povezan sa snežnim površinama na većim nadmorskim visinama. Ne zna se tačno kada je skijanje nastalo, ali zna se da ima bogat i sveobuhvatan istorijski razvoj, kako u delu opreme tako i u delu tehnike. Prve skije datiraju još iz perioda ledenog doba 4500. g.p.n.e. i bile su različitih dužina, teške i široke. Koristio se samo jedan štap. Telemark i Kristijanija bile su osnovne skijaške tehnike skretanja i zaustavljanja skijaša koje se evidentno i dan danas razvijaju i usavršavaju. Položaj, stav i pozicija skijaša doživeli su promene i usko su vezani za dizajn skija i prateću opremu. Dugačke skije različitih dužina zamenile su dve kraće skije istih dužina, savremeni automatski vezovi, dublje i tvrđe cipele i dva kraća identična štapa. Takmičarsko skijanje razvijalo se i menjalo u skladu sa zahtevima takmičenja (tehnika zavoja, dužina i radijus skija, oblik, veličina, broj i međusobni razmak štapova za kapije, kvalitet podloge, visinska razlika staze, itd.). Kratku, tešku i tvrdu skiju zamenile su šezdesetih godina uže i duže skije, da bi devedesetih njih ponovo zamenila kraća, ali lakša i šira karving skija. Novi tehnološki izazovi ski-industrije vezuju se ponovo za užu, lakšu i bržu skiju, ali i za kombinaciju kraće i duže skije u obuci početnika. Dakle, istraživanje se bavi istorijskim predstavljanjem dosadašnjih tehnika i stručne prakse u skijanju, ali i predviđanjima budućih trendova u razvoju alpskog skijanja.

Ključne reči: *skijanje, trendovi, skija, tehnika, razvoj*