



An Investigation Of Key Descriptors And Factors For Design And Marketing Of Anatomical Handles

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Abstract: Good design of any product handle is an important task. Handle design significantly determines the productivity, overall experience as well as the health in the short and long term of the product users. For designing appropriate handles, the basic and most important requirement is knowledge of the most relevant and specific product design and marketing parameters. This article is a study about the design and marketing descriptors for a specific category of product handles – namely, anatomical handles. Six expert industrial designers volunteered to participate in this research. Extensive review of relevant marketing literature on existing products with anatomical handles available on the internet was conducted and a repository of key descriptors was developed. From these descriptors, five design and marketing relevant factors were derived. These were titled as follows – (1) handle performance (along with 2 sub-categories); (2) grip function (3 sub-categories); (3) handle feel (3 sub-categories); (4) user health (4 sub-categories), and; (5) aesthetics and details (2 sub-categories). Details about the specific sub-categories, keywords and descriptor phrases have been described in the detailed article.

Index Terms – Anatomical handle, design, industrial design, marketing, verbal descriptors.

I. INTRODUCTION

Anatomical handles are ergonomically designed woodworking chisel handles that are better at reducing hand pain, improving comfort, and enhancing task efficiency, as compared to traditional handles [1]. Anatomical handle designs align with the natural form and movement of the human hand, enhancing both comfort and functionality (see Fig. 1). This design style draws justification from ergonomics, biomechanics, and user-centered design principles to craft handles that not only look good but also feel intuitive and satisfying to use. The result is a handle category that reduces strain, improves grip, and ultimately enhances the user experience.



Fig. 1: Example of anatomical handle design for gym cable attachment by HXD-ERGO [4].

The human hand is a complex structure composed of bones, muscles, and tendons, capable of a wide range of movements. Anatomical handle design aims to accommodate these movements, minimizing discomfort during prolonged use. By analyzing the natural resting position of the hand and the force distribution across the palm and fingers, designers can create handles that fit the hand's contours. This approach is particularly important in tools, kitchen utensils, and door hardware, where repeated use can lead to fatigue or even injury if the handle is poorly designed.

Anatomical handles have also found interest in scientific research. These have been studied systematically for their properties as well as performance. In one such research, researchers have explored anatomically shaped tool handles designed for optimal power grip, evaluating their ergonomic benefits and user preferences compared to traditional handles [2]. Here, in the context of knife cutting tasks, an anatomical handle was found to be most superior in terms of hand fit, subjective experience, hand-handle contact area, as well as subjective comfort, as compared to the traditional handles. In another study, researchers found that an anatomically shaped handle was rated considerably more comfortable than cylindrical handles in subjective comfort ratings, showing potential for enhancing ergonomics and performance based on optimal power grasp postures [3]. In an important handle evaluation study, researchers found that an anatomical handle was rated as the best based handle on comfort descriptors from a comfort questionnaire for hand tools (CQH). The handle was found to be overall least painful for different regions of the palm and took least time when used for a standardized wood scraping task [1].

Multiple scientific research have found anatomical handle designs performing better during different tasks. They have been found to be more fitting to the specific contexts of product use, than traditional handle designs. A specific limitation in designing anatomical handle designs that the authors have recognized is that there are very few systematic research works which have documented the most relevant and specific details about the design and features of anatomical handles. This lack of consolidated and systematic information is the motivation for this study.

1.1 Aim of the study

The aim of this study is –

1. To compile a list of important descriptors of anatomical handles as indicated by their manufacturers.
2. To classify the anatomical handle design descriptors in to meaningful design and marketing factors and categories.

II. METHODOLOGY

2.1 Recruiting the experts

Fifteen (15) design industry experts were approached through emails and phone calls to enquire if they would volunteer for this study. These experts were all formally trained designers, each possessing more than 10 years of relevant experience of design practice. The expectation was for the experts to assist with specific decision-making and assessment tasks during this study. From among the 15, six (6) designers who responded first to volunteer for the study were recruited. They were briefed about the aim of this research and were informed in detail about the expected role that they had to perform during the study.

2.2 Anatomical handle descriptors

The 6 experts then conducted an online market research and first identified examples of 60 product models currently available in the market which had anatomical handles. The experts were also required to examine the online sources to evaluate the reliability of the source and the marketing literature. The literature was expected to include information about the design features, performance characteristics, and other relevant verbal descriptions about the anatomical handles. Only 33 products met the conditions of relevant and reliable information available on the internet. After compiling the literature on these anatomical handles, a focus group session was organized. Here, the experts were given the task of shortlisting only the most relevant key words, concepts and descriptors from the literature. The session was initiated and mediated by the authors (both expert designers). The panel examined the entire body of the relevant literature on anatomical handles which

had been compiled. In consultation and agreement of the panel, the most meaningful descriptors were identified. A card sorting exercise was subsequently conducted to consolidate and classify these in to meaningful design and marketing categories and factors. The authors in consultation with the experts also came up with appropriate titles for different factors, and their sub-categories.

III. RESULTS AND DISCUSSION

Based on the analysis of the marketing descriptors, the researchers identified 5 different main factors underlying the anatomical handle descriptors. These are – (1) handle performance; (2) grip function; (3) grip feel; (4) user health, and; (5) aesthetics and details. Details of each of these factors, including the details of their sub-categories, the specific keywords associated with each sub-category, as well as the original verbal descriptors - have been provided in the following sub-sections.

3.1 Factor-1: Handle performance

Under this factor, first the descriptions related to the use and handle output sub-category have been considered. These were described by the manufacturers under ideas (keywords) such as accuracy, precision, efficiency, effectiveness, use and usability and user experience. Another set of descriptions considered under Factor-1 are related to user force and strength. The marketing literature discusses these using keywords like force, strength, power, reaction, demand, effort and muscle. The specific descriptions from product literature related to the performance and experience factor have been provided in Table 1.

Table 1: Handle performance.

Sub-category name	Keyword	Specific description in the marketing literature
Use and handle output	Accurate	Improves accuracy of task and efficiency [4-5].
	Precise	Enhances your precision; the precise and scientific grip prevents the activation of auxiliary muscle groups, hence conserving effort, preventing muscle compensation [6-7].
	Efficient	Grip that is ergonomic, safe, comfortable and efficient; accuracy of aim and efficiency, especially when working intuitively; handle heavier, which will help to be more stable, and improve working efficiency [4-5].
	Effective	Ergonomic anatomical grip allows the user to reduce callus formation and effectively reduces secondary injuries [8].
Force and strength	Force	Enhances the user's force; relieve pressure on the hand by equally distributing the force applied on the surface of the grip; helps propel with more force while taking pressure off your fingers and distributing it; helps you obtain better gather force; participates in the absorption of the mechanical forces affecting the hand [4,6,9-10].
	Strength	Ideal for users with reduced grip strength; minimizes grip strength required for task; reduces relative grip strength necessary for safe task; consistent high-strength grasp; enhances our effective grip strength; enhancing grip strength for those with hand injuries, joint pain and/or arthritis is crucial to their safety & independence; reduces the amount of strength necessary to hold the grip securely [11].
	Power	Designed for maximum gripping power; ensures power via large surface area on handle end for when that extra push of power is needed; powerfully reliable to take on your heavy-duty tasks [12-14].
	Reaction	Provides improved reaction performance [15].
	Demand	Larger handle to grasp, reducing the demand on fingers, hands, forearm muscles [16].
	Effort	Dramatically reduces physical effort; ensures less effort; diminishes the squeezing efforts; conserves effort [17].

Muscle	Minimizes muscle and joint strain; correct hand position reduces the stress on the muscles and joints of the fingers, wrists, arms and shoulders; prevents the activation of auxiliary muscle groups, hence conserving effort, preventing muscle compensation [3,7,18].
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3.2 Factor-2: Grip function

Under this factor, the first set of descriptions are those relating to the grip position sub-category. These were described by the manufacturers under ideas (keywords) such as correct, scientific, firm, straight, stable, position and direction. Another set of descriptions considered under Factor-2 are related to slip and rotation control. The marketing literature discusses these using keywords like slip and slide, rotation and twist. Only one source refers to the scenario of the handle use wearing gloves, and the experts have listed this under the sub-category of grip compatible. In the literature, the keyword glove was associated with this sub-category. The specific descriptions from product literature related to the grip function factor have been provided in Table 2.

Table 2: Grip function.

Sub-category name	Keyword	Specific description in the marketing literature
Grip position	Correct	Handle that fits the palm is designed to help you obtain the correct hand posture; the correct hand position reduces the stress on the muscles and joints of the fingers, wrists, arms and shoulders [3,7].
	Scientific	Precise and scientific grip [7].
	Firm	Anatomic ones are held relatively “firm” in the hand; prevents the hand from slipping and nestles firmly in your hand; recommended for larger hands it seems relatively thick and allows a firm grip; anatomic ones are held relatively “firm” in the hand; features anti-slip handle for a firm and comfortable grip [19-21].
	Straight	The shape of the grips holds the wrist straight rather than having the wrist bend [22].
	Stable	More stable, strong and secure grip; guarantees stability and manoeuvrability; the index finger loop substantially improves control and stability [28,23-24].
	Position	Ergonomic position of the hands makes the task from the start productive; ergonomic positioning and design of the grips keep hands and wrists in their natural position, diminishing wrist pain and nerve damage; a consistent/comfortable high-strength grasp, yields muscle memory for tool position & direction; unique design positions hand directly over the task [7,11,25,29].
Slip and rotation control	Direction	A consistent/comfortable high-strength grasp, yields muscle memory for tool position & direction; large thumb & finger handle contours/ facets enhance directional & roll control to minimize injury risk [11].
	Slip, slide	The handle is angled at the end to prevent slipping; slip-resistant grip; anti-slip reduces the hand rub to increase comfort; hand-stop has a widened section which allows an axial stop for the hand preventing it from slipping; textured finger points provide slip resistance; comfortable anatomical grip prevents the hand from slipping; anti-slip handle for a firm and comfortable grip; fit the user’s hand in a dynamic, non-slip and ergonomic manner; special non slip texture; deep contours in the handles prevent our hand from sliding forward into the tool & the tool from slipping out of our hand [8,10,11,15,20-21,26-28].
	Rotation	Flattened shape allows the anti-rotation effect of the hand; flat zone on the handle’s upper surface is the first part of the anti-rotation couple; the fingers’ position on the flat zone under the handle is the second part of the anti-rotation couple; a streaked longitudinal area was placed under the handle to allow the fingers to have better grip and avoid unwanted rotations of the hand around the handle; properly sized & placed handle facets reduce the dangers of a handle rotating in our grasp [10-11].

	Twist	Due to handle flat shape, the hand doesn't twist anymore, eliminating the micro-rotations [10].
Grip compatible	Glove	Wide grip for gloved hands; handle also guarantees stability and manoeuvrability whether you are wearing gloves or with bare hands [17,24].

3.3 Factor-3: Handle feel

Factor-3 includes first, the descriptions relating to the grip comfort sub-category. These were referenced using keywords such as comfort, natural, fit, support and rest. Another set of descriptions have been classified as finger placement. The keyword finger was referenced to access the descriptors here. Then there are descriptions under Factor-4 that are classified as use and experience related. The keywords like use, usability, user experience and feel in the literature were referenced under this category. The specific descriptions from product literature related to the handle feel factor have been provided in Table 3.

Table 3: Handle feel.

Sub-category name	Keyword	Specific description in the marketing literature
Grip comfort	Comfort	Ultra-soft, right-sized and textured handle that can be gripped in several ways for more comfort and control; ergonomic grips improve comfort and control by increasing support at the palm; fingers rest comfortably below the grip in the specially designed "finger grooves"; ergonomically shaped handle with soft components to offer a comfortable and secure grip in hand; expanded cushioned palm surface putting less stress on fingers and providing a comfortable and secure grip; comfortable to hold and use; fit the natural contours of your hand and provide a comfortable ergonomic grip; comfortable design can also be beneficial to those with painful hands due to arthritis; enhances grip comfort by evenly distributing pressure on the palms; eliminates excessive friction that can lead to pain, skin abrasion, and blisters, so enhancing comfort; for maximum gripping power and comfort; textured handle for vastly improved grip and greater comfort; the anatomical palm grip handle will fit comfortably in your hand, reducing the impact on your wrist, helping those with hand problems, such as arthritis and rheumatism; molded wing like form for even more comfort; comfort via padded grip; comfort-grip to avoid pressure points on hands; comfortable grip that perfectly aligns with the natural contours of your hand; each grip feels natural and secure, enhancing usability and comfort; ergonomic shape of the handle nestles comfortably in the palm of your hand; for maximum support and comfort; anti-slip handle for a firm and comfortable grip; designed for greater comfort and less fatigue [7-8,12,16,21,23,26,29-32].
	Natural	Anatomical handle provides a comfortable grip that perfectly aligns with the natural contours of your hand; handles are sized & contoured to engage your natural grasp, minimizing grip strength required to safely work; asymmetrical handle geometry, correlating with your natural grasp, alleviates a wide range of issues; match the natural grip of the hand instead of forcing you into awkward grip positions; enhances natural stance hold on your tool; fits the shape and natural motion of your hand; fit the natural contours of your hand; allow a very natural control of the tool; natural handling of the tool; keeps hands and wrists in their natural position, diminishing wrist pain and nerve damage; natural safe grip without nerve compressions [10-11,15,23-25,33-35].
	Fit	Grips will fit your hands like a glove; fit the shape of a closed hand; handle has a slightly flat shape to fit the hand providing therefore a better grasp; anatomic grip is shaped to fit perfectly in one's palm; fit the user's hand in a dynamic, non-slip and ergonomic manner [8-10,20].

	Support	Ergonomic grips improve comfort and control by increasing support at the palm; a flat area supporting the thumb's movements against the handle; with permanent support for the hand's palm, the user can reduce the fatigue in his/her fingers and forearms; palm's support contributes to the handle's flattened shape; extra support surface compared to a cylinder handle, thus decreasing the pressure on the specific points of the hand and therefore of blisters; large palm surface provide added support to reduce hand fatigue and strain [10,30,36].
	Rest	A special groove allows the thumb to rest while the fingers can easily hold onto the grip strain-free; the fingers rest comfortably below the grip; the user can naturally rest the hand on the handle and therefore reduce the fatigue in the fingers and forearms; the palm rests perfectly on this large area, which allows better control of the handle and reduce the specific pressure on the palm thus avoiding blisters; the inner stop allows the user's hand to rest on it in [8,10,34].
Finger placement	Finger	A special groove allows the thumb to rest while the fingers can easily hold onto the grip strain-free; the fingers rest comfortably below the grip thanks to its specially designed "finger grooves"; fingers nestle between the notches reducing the amount of strength necessary to hold the grip securely; a larger handle to grasp, reduces the demand on fingers, hands, and forearm muscles; a built in ledge above the thumb position, this ridge helps propel with more force while taking pressure off your fingers and distributing it to the top part of your hand; flat zone is under the handle where the fingers are placed, the fingers' position on that zone is the second part of the anti-rotation couple; a streaked longitudinal area was placed under the handle to allow the fingers to have better grip and avoid unwanted rotations of the hand around the handle; correct hand position reduces the stress on the muscles and joints of the fingers; built in finger grooves for most solid and repeatable grip; textured finger points provide slip resistance, grip, and safety; protective finger guard for added safety; ensures control via finger contours; better grip and control as your fingers wraps around the handle very nicely; individual finger, thumb & palm touch points are integrated to enhance the user's grasp, comfort & control; large thumb & finger handle contours/ facets enhance directional & roll control to minimize injury risk; geometrical facets (grip areas) for individual finger segments & the thumb, enhance our effective grip strength [7,9-13,16,28,34,37-38].
Use and experience	Use, usability	Its thoughtful design ensures that each grip feels natural and secure, enhancing usability and comfort; ergonomically designed handle that ensures comfort for everyday use; ergonomically shaped for easy gripping, it is comfortable to hold and use; all-day use provides safe, comfortable, solid and steady support [16,33,39-40].
	User experience	Large pressure application areas reduce peak pressure points by 90% for a stress/ pain-free user experience [11].
	Feel	Pressure-reducing ergonomic design reduces fatigue for feel and control [41].

3.4 Factor-4: User health

Under this factor, the first set of descriptions are those relating to the pain and risks sub-category. These were described by the manufacturers under ideas (keywords) such as pain, ache, strain, stress, injury and fatigue. Another set of descriptions considered under Factor-4 are related to friction and pressure. The marketing literature discusses these using keywords like friction, pressure, rub, shock, blister, callus and soreness. Then there are descriptions under Factor-4 that are referenced with regards to secondary disorders. These include the use of keywords like carpal tunnel syndrome, rheumatism, arthritis and Parkinson's. Also, Factor-4 includes descriptions regarding hand safety. The keywords like safe and protect in the literature were referenced under this category. The specific descriptions from product literature related to the user health factor have been provided in Table 4.

Table 4: User health.

Sub-category name	Keyword	Specific description in the marketing literature
Pain and risks	Pain	Helps those with arthritis, Parkinson's, and limited dexterity eat more easily without the pain they otherwise experience using regular sized utensils; fit your hands like a glove, making your work less painful; the comfortable design can also be beneficial to those with painful hands due to arthritis; enhances grip comfort by evenly distributing pressure on the palms, thereby decreasing pain and discomfort in the hands during activity; eliminates excessive friction that can lead to pain, skin abrasion, and blisters, so enhancing comfort; grips keep hands and wrists in their natural position, diminishing wrist pain and nerve damage; decrease hand strain and wrist joint pain; moulded to a left and right hand to remove the risk of pain or blisters; large pressure application areas reduce peak pressure points for a stress/ pain-free user experience; enhancing grip strength for those with hand injuries, joint pain and/or arthritis is crucial to their safety & independence; recommend to people who already have wrist pain [7,9,11,16,22,25,32,39,42].
	Ache	designed and shaped to distribute weight more evenly through the palms of the hands to ensure the safest and securest grip, which in turn helps to prevent soreness or aches in the hands, wrists, arms and shoulders; dramatically reduce physical effort, blisters, backache and hand fatigue [17,43].
	Strain	helps to decrease hand strain and wrist joint pain; fingers can easily hold onto the grip strain-free [34,39].
	Stress	reduces peak pressure points for a stress/ pain-free user experience; minimize distortion, stress and pressure points; puts less stress on fingers; the grip reduces stress on the fingers [11,31,43].
	Injury	large thumb & finger handle contours/ facets enhance directional & roll control to minimize injury risk; enhancing grip strength for those with: hand injuries, joint pain and/or arthritis is crucial to their safety & independence; ergonomic anatomical grip allows the user to reduce callus formation and effectively reduces secondary injuries such as carpal tunnel syndrome [8,11].
	Fatigue	large palm surface provides added support to reduce hand fatigue and strain; work with less fatigue; reduces the fatigue in fingers and forearm; reduces user's muscular fatigue; reduces pressure on the wrist, elbow, and other joints in order to prevent joint damage and fatigue; spreads the pressure across more of your hand, resulting in less stress and fatigue; spreads the load evenly across the hand to reduce pressure and consequent fatigue [7,10,29,36,40,44].
Friction and pressure	Friction	Because of shocks, on a cylinder-shaped handle, the hand does micro-rotations on the handle, generating micro-frictions leading to blisters; flexible grip eliminates excessive friction that can lead to pain, skin abrasion, and blisters, so enhancing comfort and allowing you to concentrate more on your task [7,10].
	Pressure	Pressure-reducing ergonomic design; crafted to minimize pressure points in the user's grasp; large pressure application areas reduce peak pressure points; offer optimal pressure distribution throughout the hands; allows the pressure to be spread evenly across the palm; reduces the specific pressure on the palm thus avoiding blisters; evenly distributing pressure on the palms, thereby decreasing pain and discomfort in the hands during activity [7,10-11,32,41].
	Rub	anti-slip, and reduces the hand rub to increase comfort [4].
	Shock	By reducing "crutch shock" they will improve the health of your hands, wrists, arms and shoulders; hand-stop has a widened section which allows an axial stop for the hand preventing it from slipping during shocks; because of shocks,

		on a cylinder-shaped handle, the hand does micro-rotations on the handle, generating micro-frictions leading to blisters [10,37].
	Blisters	Moulded to a left and right hand to remove the risk of pain or blisters; palm rests perfectly on this large area, which allows better control of the handle and reduce the specific pressure on the palm thus avoiding blisters; handle flat shape, the hand doesn't twist anymore, eliminating the micro-rotations and thus diminishing greatly the risks of blisters; extra support surface compared to a cylinder handle, thus decreasing the pressure on the specific points of the hand and therefore of blisters; eliminates excessive friction that can lead to pain, skin abrasion, and blisters [7,10,42].
	Callus	Ergonomic anatomical grip allows the user to reduce callus formation and effectively reduces secondary injuries; weight-bearing surfaces of the grip stay static against your palms so skin shear is eliminated and calluses are diminished [8,37].
	Soreness	Offering optimal pressure distribution throughout the hands, the handle helps solve common hand issues - numb hands, sore wrists, sore forearms, etc.; designed and shaped to distribute weight more evenly through the palms of the hands to ensure the safest and securest grip, which in turn helps to prevent soreness or aches in the hands, wrists, arms and shoulders [43,45].
Secondary disorders	Carpal tunnel syndrome	Ergonomic anatomical grip allows the user to reduce callus formation and effectively reduces secondary injuries such as carpal tunnel syndrome; palm handle works especially well for people experiencing carpal tunnel syndrome or arthritis [8,36].
	Rheumatism	Orthopedic style handle will fit comfortably in your hand, reducing the impact on your wrist, helping those with hand problems, such as arthritis and rheumatism; it distributes your weight over a large surface area of your palm, reducing the impact on your hand and wrist, adding great benefits to sufferers of hand problems, such as arthritis and rheumatism [46].
	Arthritis, Parkinson's	Enhancing grip strength for those with: hand injuries, joint pain and/or arthritis is crucial to their safety & independence; designed to make it easier for those with arthritis to work with greater comfort and less fatigue; Arthritis friendly; ergonomic built-up grip that helps those with arthritis, Parkinson's, and limited dexterity work more easily without the pain they otherwise experience using regular sized tools; ideal for those who have difficulty in grasping a conventionally shaped handle, the comfortable design can also be beneficial to those with painful hands due to arthritis, or similar problems; palm handle works especially well for people experiencing carpal tunnel syndrome or arthritis; orthopedic style handle will fit comfortably in your hand, reducing the impact on your wrist, helping those with hand problems, such as arthritis and rheumatism; distributes your weight over a large surface area of your palm, reducing the impact on your hand and wrist, adding great benefits to sufferers of hand problems, such as arthritis and rheumatism [11,16,29,32,36,43,46].
Hand safety	Safe	Grip that is ergonomic, safe, comfortable and efficient; enhance the user's: grasp, safety, comfort, cutting force & control; widened hand-stop, without additional squeezing efforts allows for a safer grip on the handle; textured finger points provide slip resistance, grip, and safety; protective finger guard for added safety; designed and shaped to distribute weight more evenly through the palms of the hands to ensure the safest and securest grip; all-day use provides safe, comfortable, solid and steady support; offers a perfect ergonomic for a natural safe grip without nerve compressions [5,10-11,24,28,40,43].
	Protect	Protects you against wrist strain [14].

3.5 Factor-5: Aesthetics and details

Under this factor, the first set of descriptions are those relating to the familiarity sub-category. These were described by the manufacturers under keyword of form. Another set of descriptions considered under Factor-5 are related to design details. The keywords like detail, thoughtful and craft in the literature were referenced under this category. The specific descriptions from product literature related to the aesthetics and make factor have been provided in Table 5.

Table 5: Aesthetics and details.

Sub-category name	Keyword	Specific description in the marketing literature
Familiarity	Form	Grip is specific to either your right or left hand with a molded wing like form for even more comfort [40].
Design details	Detail	Handle designed with meticulous attention to detail [33].
	Thoughtful	Thoughtful design ensures that each grip feels natural and secure, enhancing usability and comfort [33].
	Craft	Crafted to minimize pressure points in the user's grasp, handmade to fit your dominant hand [11].

IV. MOST IMPORTANT FINDINGS

When analyzing the overall findings from the research, the authors and the experts reflected on the most important insights in the design and marketing of anatomical handles. Most relevant reflections have been discussed here.

It was mentioned by multiple brands that the anatomical grip being precise, enhances the task accuracy. Since the grip offers grooves or profiles for different parts of the hands, the grip is also easily repeatable. What is also beneficial is that the anatomical shape fits the hands well and each grip feels natural and secure. Due to a large surface contact between the hand-handle, the force is distributed across the hand which helps with greater force transmission and lesser cases of peak-pressure formation. Additionally, the handle geometry features also help in reducing slips and micro-rotations of the product in hand which helps with safety, accuracy and fewer hand-arm injuries. An important fact is that the peculiar wing-like form of anatomical handle offers it a unique pleasant and attractive aesthetics. Also, due to its elaborate form, the handle is heavier, which is more and safe for activities in many work conditions.

V. CONCLUSION

Through this paper, an attempt to formally recognize the value of anatomical handles through a scholarly work has been attempted. Anatomical handle design is more than just a trend; it's a thoughtful approach to product development that prioritizes the user's physical interaction with a product. By focusing on the natural ergonomics of the human hand, these handles offer improved comfort, efficiency, and safety. For designing and marketing anatomical handles, the key is to communicate the features and benefits clearly. In this article, the descriptions of features and benefits of anatomical handles as described by different reliable secondary sources have been provided. The idea is also to improve the visibility of this class of handles before the design and research community. As compared to the commonly available conventional handle designs, the more peculiar looking anatomical handles offer to their operators, multiple unique benefits. That is why, an important aim of this article is to provide a nudge and motivation to the readers for paying greater attention to these handles in future handle research and development. Exciting opportunities for intervention could be clearly interpreted from the many benefits of these handles that are highlighted by reliable and relevant marketing and scientific literature.

An important contribution of this study is that a repository of key descriptors has been developed regarding anatomical handles. These have been documented in the form of key verbal descriptors, keywords, factors and their sub-categories. In the future, these concepts could be examined in contextual detail during design and research of anatomical handles.

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