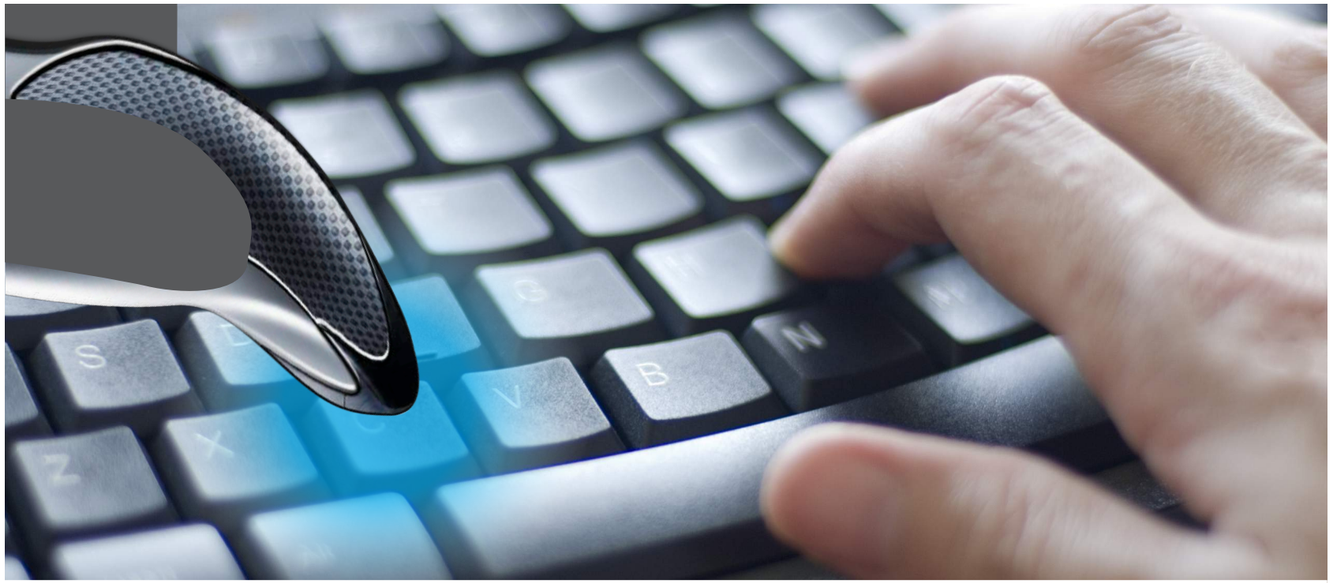
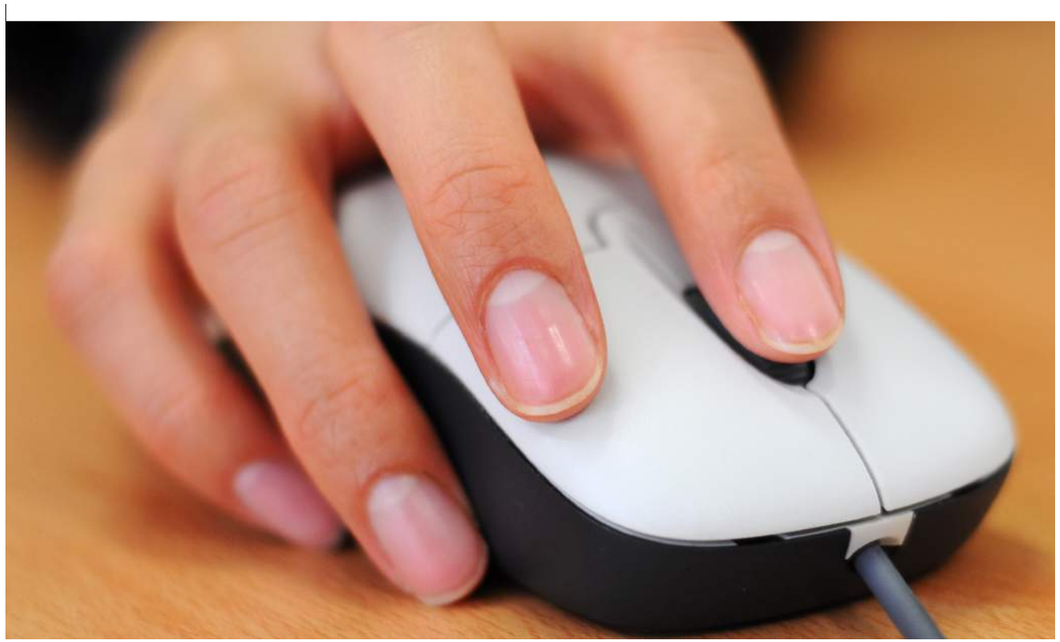


DAGR

Wield the Cursor

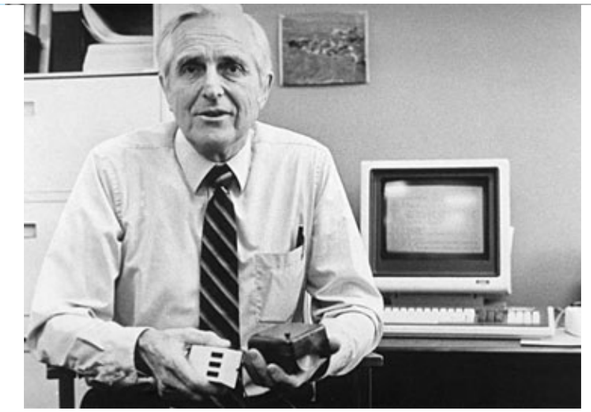


Adrian Po Villanueva
California State University, Long Beach

Introduction

In 1962, Douglas Engelbart, a Director of Augmentation Research Center at Stanford Research Institute, set out to augment human intellect. Engelbart and William (Bill) English, a colleague, required a device to move a cursor to interect with information displays. Together, they considered items such as light pens and joysticks. Their research led to the mouse for its efficient design and configuration.

With its efficient and practical design, the mouse has not diverged from its original design throughout the years. Today, is it used in many environments such as the business, domestic, and educational environments.

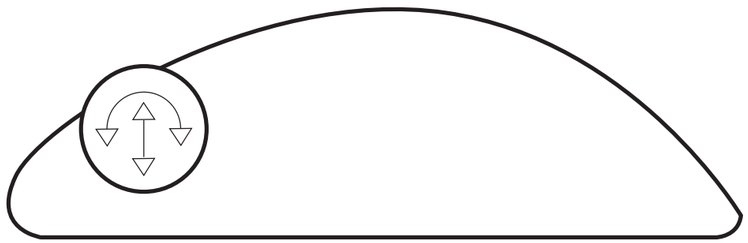


Objective

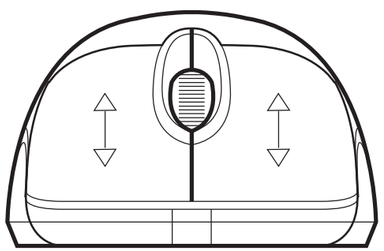
Design a pointing input device that allows individuals to interact with an information interface

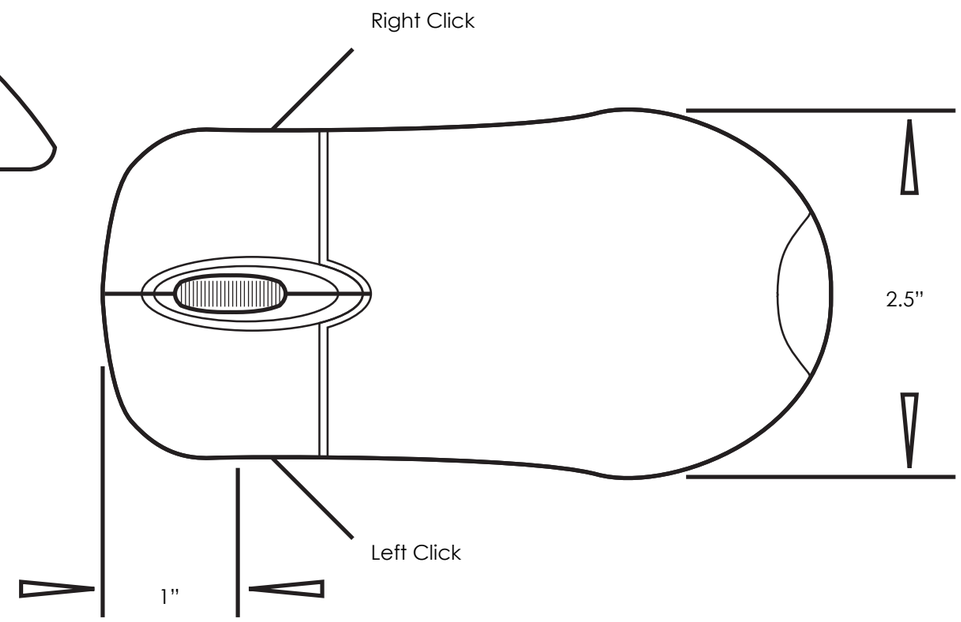
Microsoft Wheel Mouse Optical USB

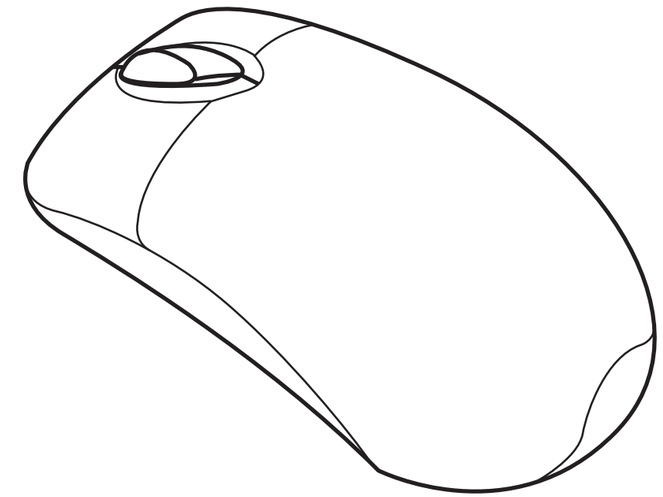
0.75" Diameter Scroll Wheel Functions

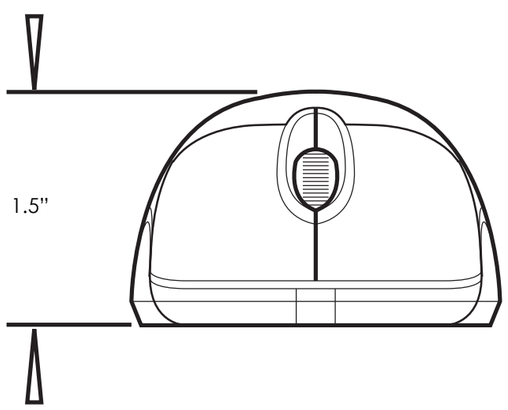


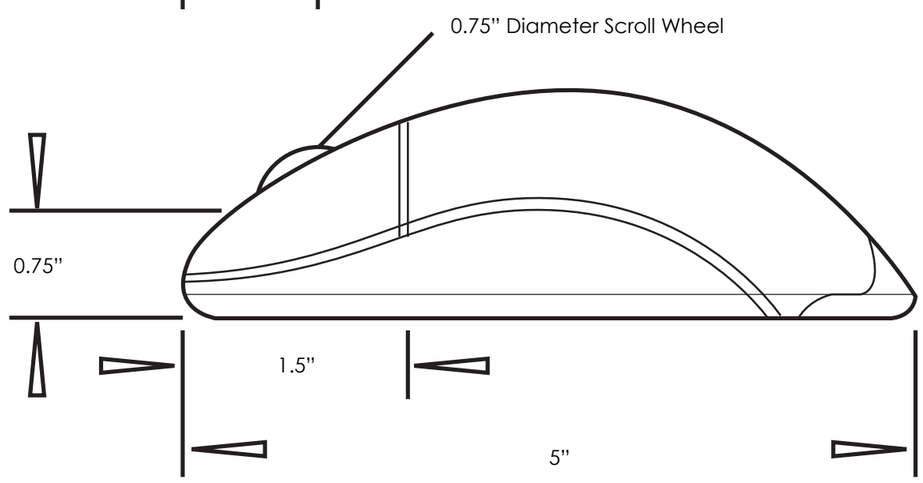
Left/Right Click Functions

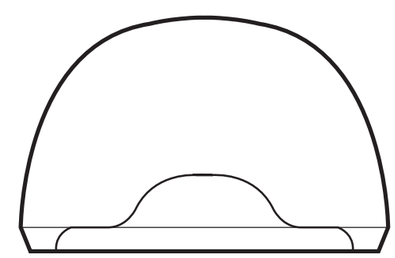






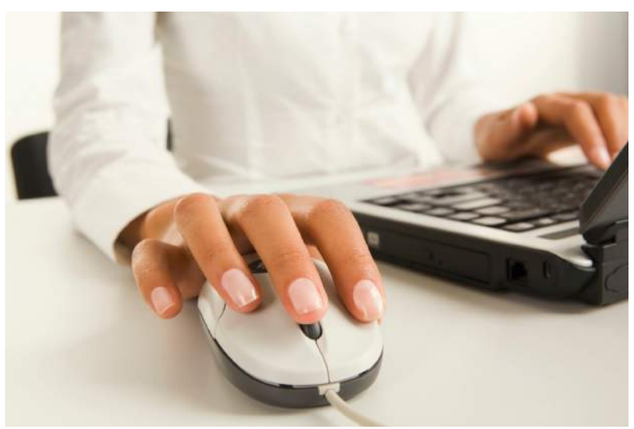


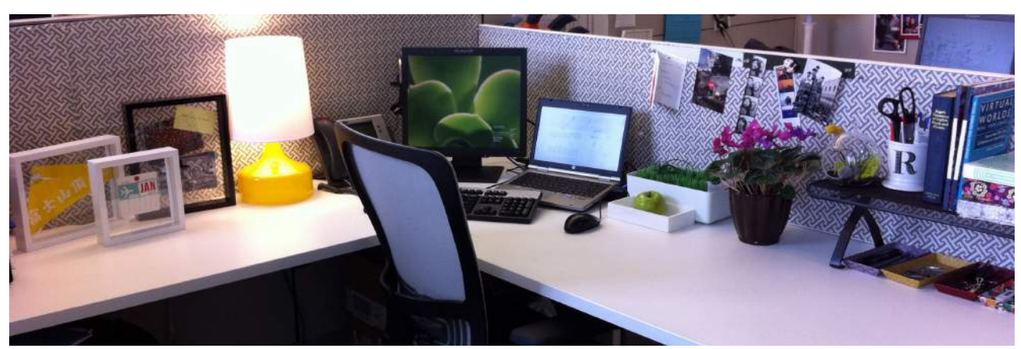




Market: The Accountant

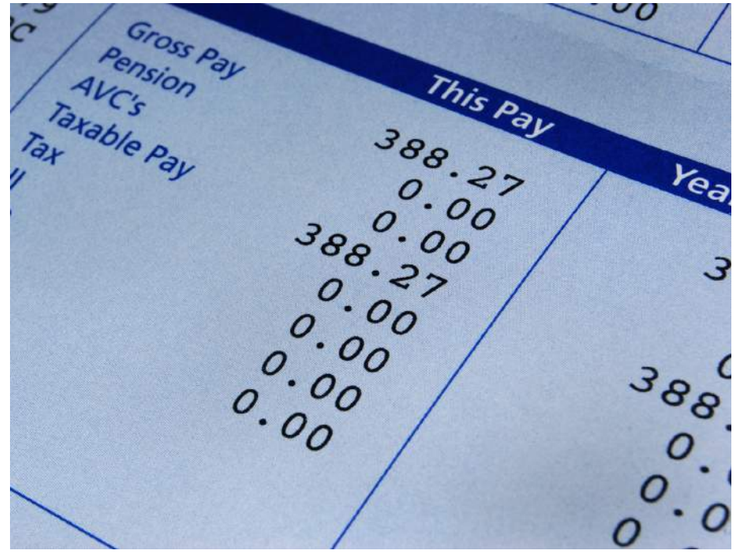
Unfulfilled Salaryman Stagnant





Makes $30,000 to $50,000 per year
Sits in front of a computer for 8 hours a day minimum
Works in a colorless and stressful environment
Negatively effected by their desktop computers through stress, disconnection, communication breakdown, and health
Ergonomically concerned

Task



Payroll
Balancing Budgets
Pay Invoices
Allocating Funds
Reimbursements
Inventory Control

Competition

Competitive Matrix

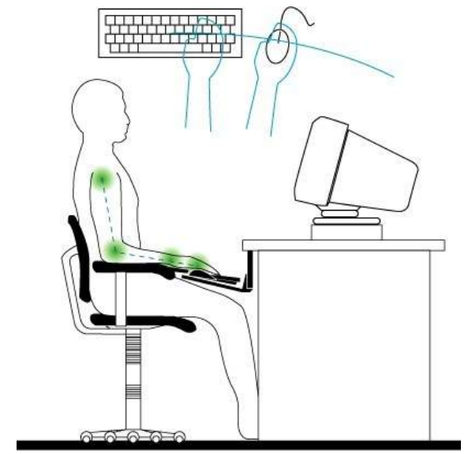


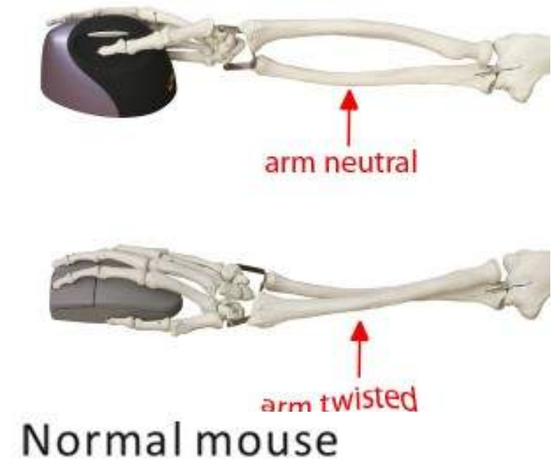


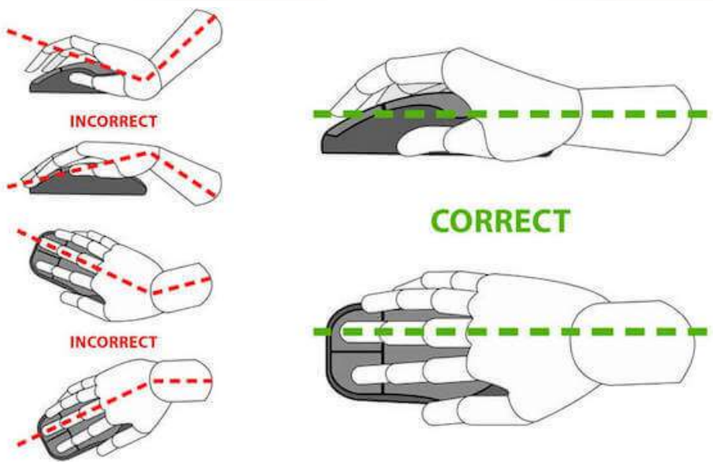


Name	AmazonBasics 3-Button USB Wired Mouse	Etekcity Scroll Endurance Vertical Gaming Mouse	DBPOWER® USB2.0 Wireless Finger Handheld Mouse	Logitech M510 Wireless Mouse	YCCTEAM 4000 Professional Gaming Mouse	Logitech M570 Wireless Trackball	Apple Magic Mouse
Retail Price	$6.99	$25.00	$29.99	$39.99	$49.99	$59.99	$69.99
Hardware Interface	USB	USB	Wireless	Wireless	USB	Wireless	Wireless
Sensor Technology	Optical	Optical	Trackball	Laser	Laser	Trackball	Laser
Color	Black	Black/Silver	Black	Black/Silver	Black/Aluminium	Black	White/Clear
Lights	None	None	None	Green	Multi-Color (7 Colors)	Green	None
Battery	None	None	AAA x1	AA x2	None	AA x 1	AA x 2
Number of Buttons	3	6	5	5	10	5	1
Material	ABS	ABS	ABS	ABS	ABS Aluminium Carbon Fiber	ABS	Polycarbonate Aluminium

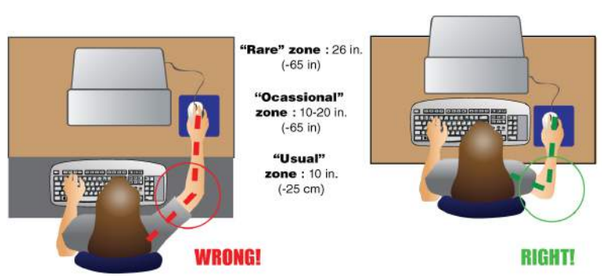
Ergonomics

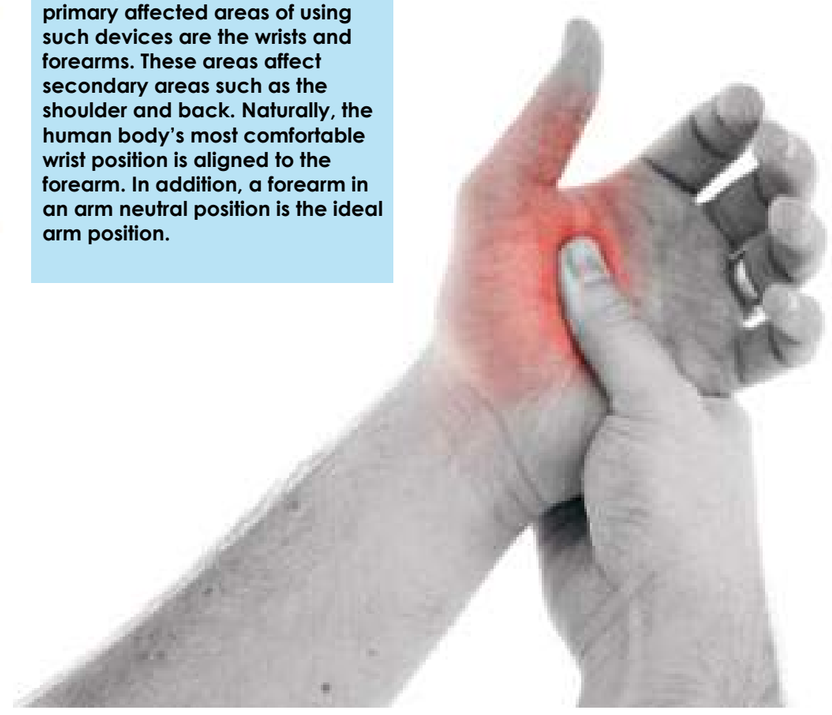


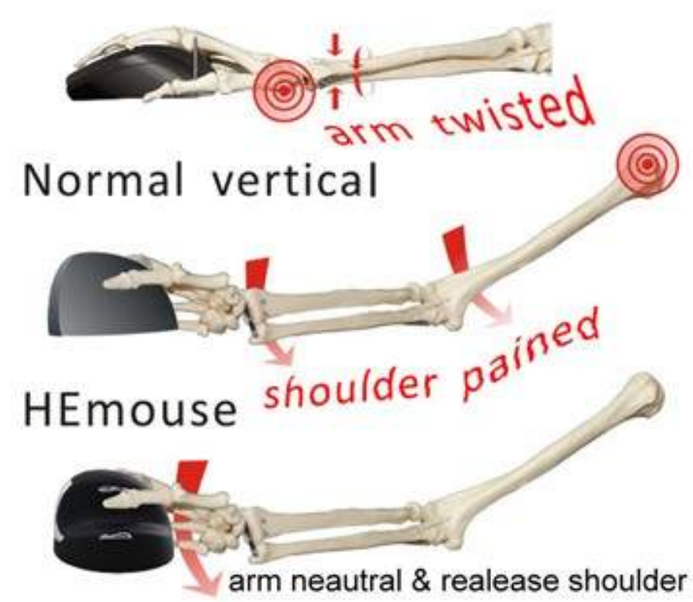




Despite the various forms of pointing input devices, the primary affected areas of using such devices are the wrists and forearms. These areas affect secondary areas such as the shoulder and back. Naturally, the human body's most comfortable wrist position is aligned to the forearm. In addition, a forearm in an arm neutral position is the ideal arm position.







Constraints

Seating Position of the User Affects Ergonomics

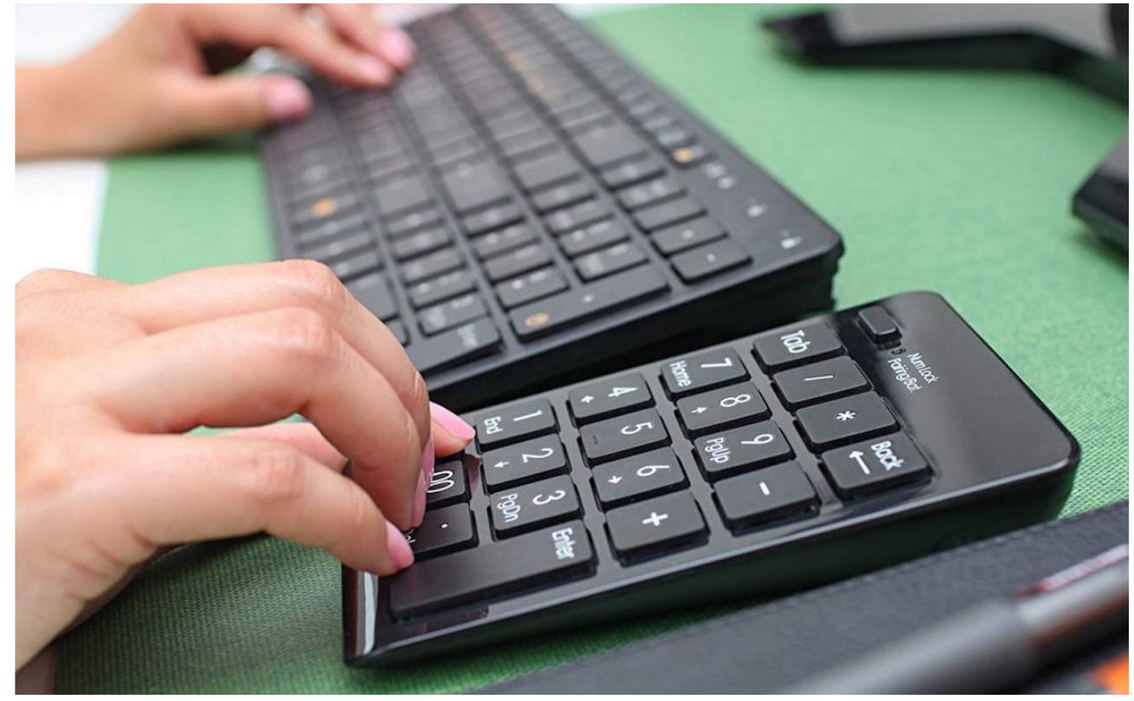
The largest factor that affects the experience of a pointing device is the user's seating position. An ideal seating position will minimize any discomfort experienced by the user.

Desk Organization

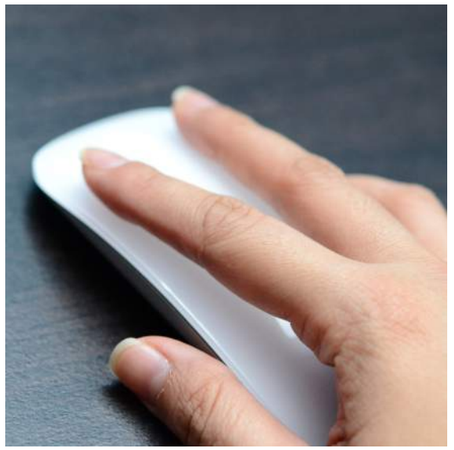
Without proper desk organization, the possible areas for a pointing device becomes scarce.

Heavy Use of Numeric Keypads

A large part of accounting is heavy use of numeric keypads to complete numbers-based tasks.

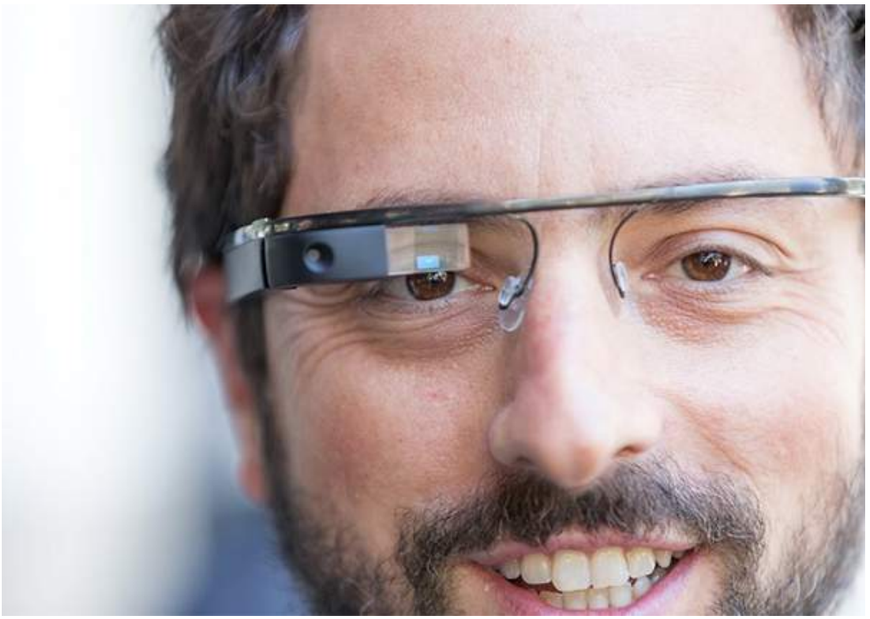


Configuration



Configuration	Conventional	Trackball	Vertical Conventional	Trackpad
Convenience	●●○○○	●●●●●	●●○○○	●●●●●
Speed	●●●●○	●●●●●	●●●●○	●●●○○
Discomforts	Wrist and forearm discomforts which potentially leads to shoulder and back discomforts. Discomforts are produced by incorrect wrist movements. Despite using this configuration ergonomically correct, the forearm's twisting nature produces discomforts during use.	With no objective movement, the input of this configuration relies heavily on the fingers which focuses all discomforts in the wrist. With the focus of small movements using fingers, the wrist is strained for its constant use.	A vertical configuration limits the potential discomfort that may be produced by the forearm. As a result, any discomfort caused is incorrectly using the wrist to move the mouse which will lead to shoulder and back discomforts.	Although this is the most convenient configuration, the trackpad focuses too much discomfort on the wrist like a trackball. Trackpads are small which means a smaller surface area for movement. This is due to the constant movement of the fingers rather than the whole arm to move a cursor.

Efficiency



Shorthand

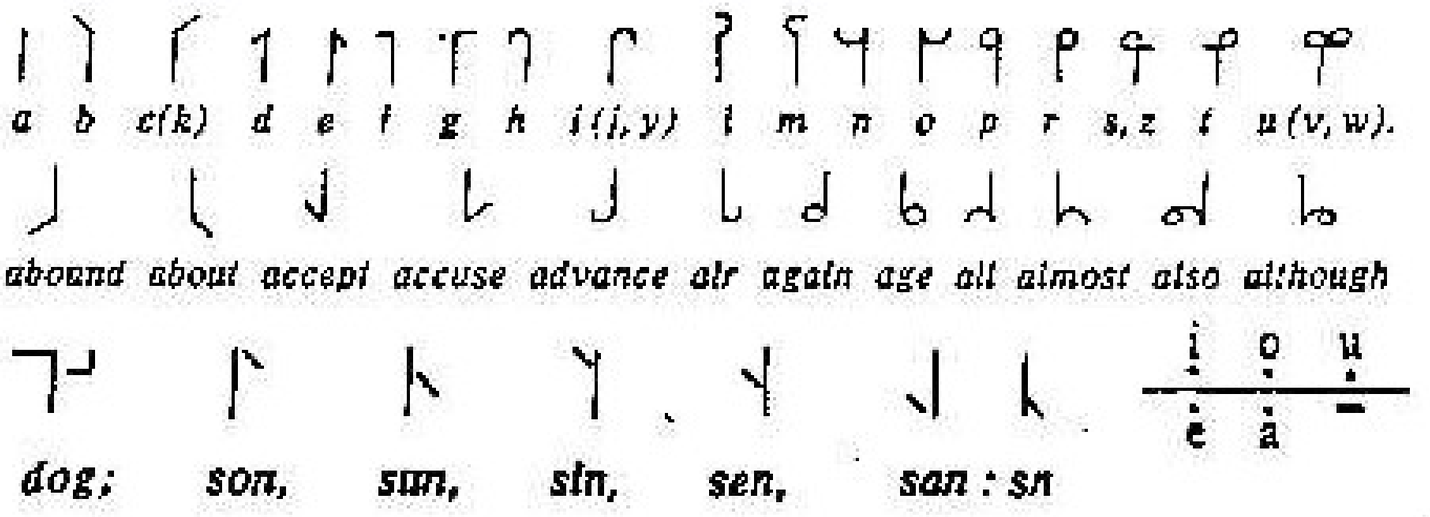
With the use of subtle gestures, shorthand may be a way to increase the efficiency of accountants by programming mice

Pen and Tablet

In the creative world, a pen and tablet is the most efficient way to create art to substitute a touchpad or a mouse as a cursor

Optical Head-Mounted

Eyes are used by people to focus on a particular area in their work. As technology advances, an eye focusing on an area or object will be easily read by a in the near future.

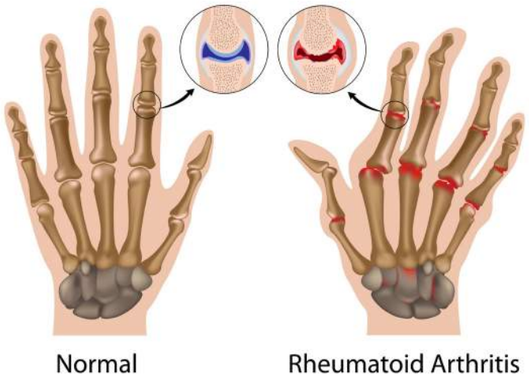


Arthritis

Causes

Injury in the Joints
Abnormal Metabolism
Infections
Overly Active Immune System

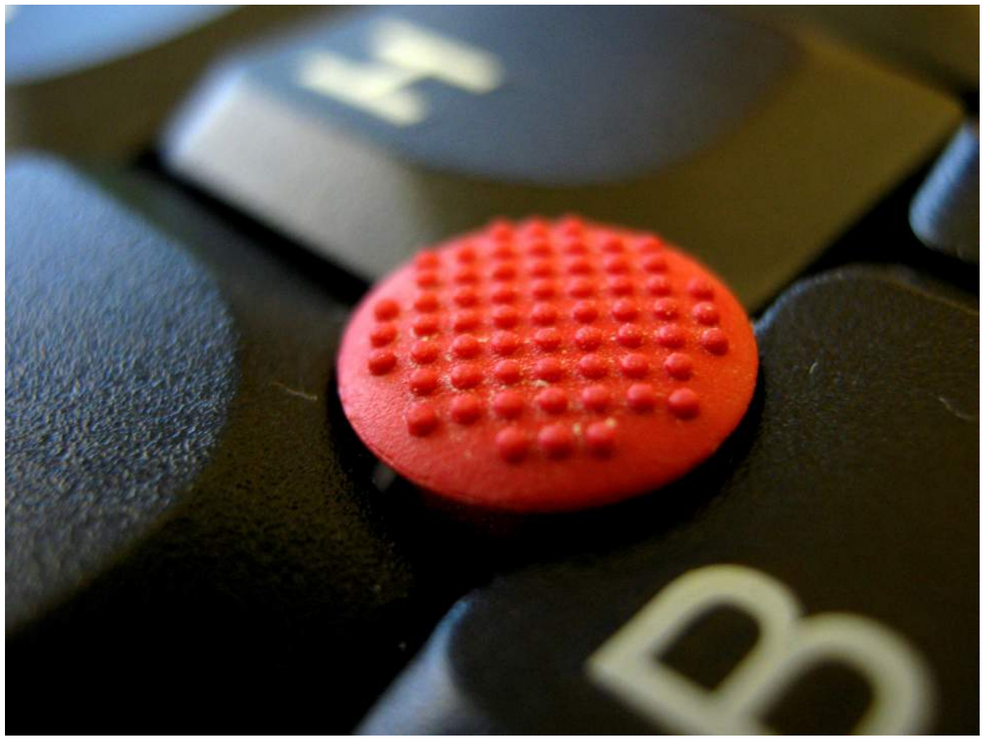
Statistically, right-handed individuals are more likely to develop arthritis. Due to the excessive use of the right hand throughout their lives.

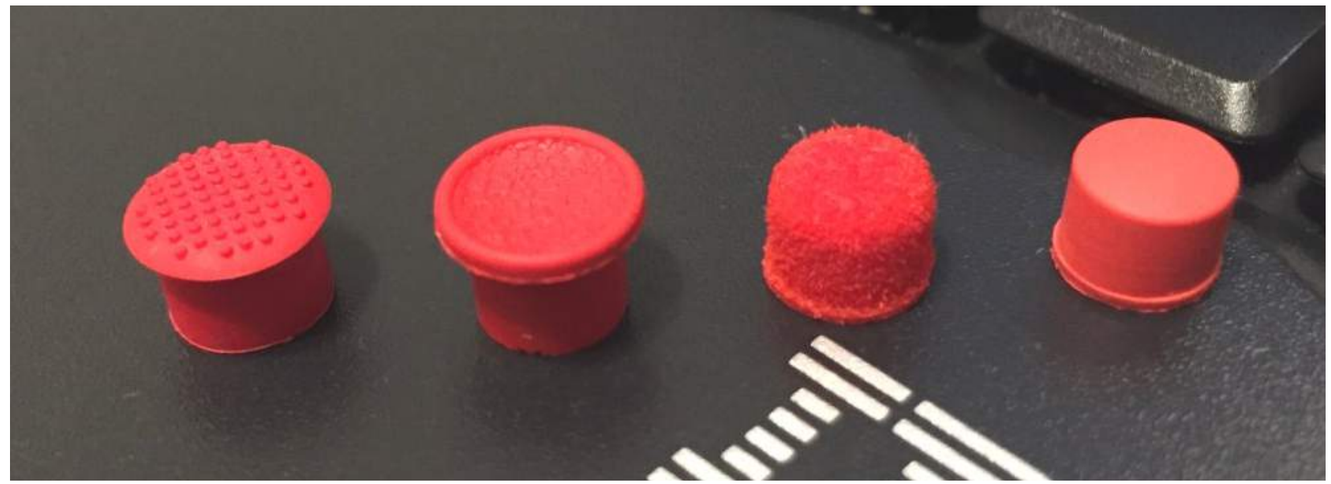


Symptoms

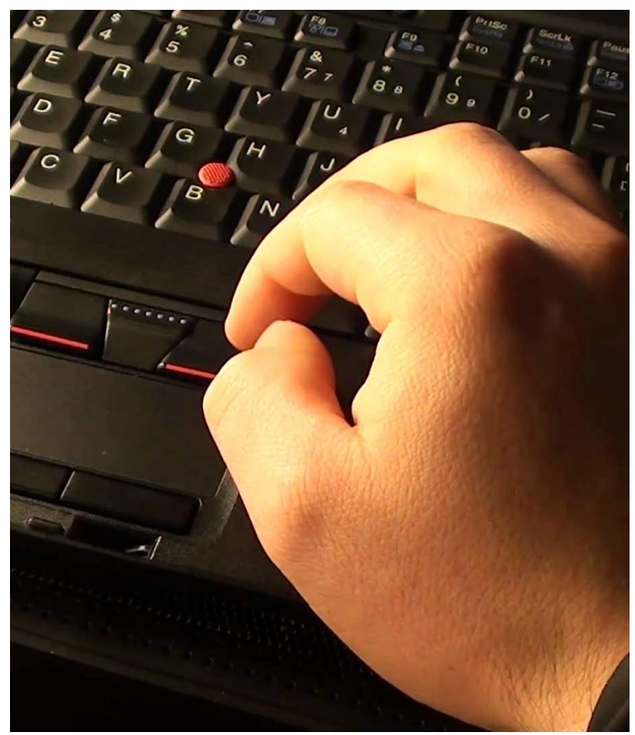
Pain
Swelling
Changes in Surrounding Joints
Warmth
Crepitation
Looseness
Cysts

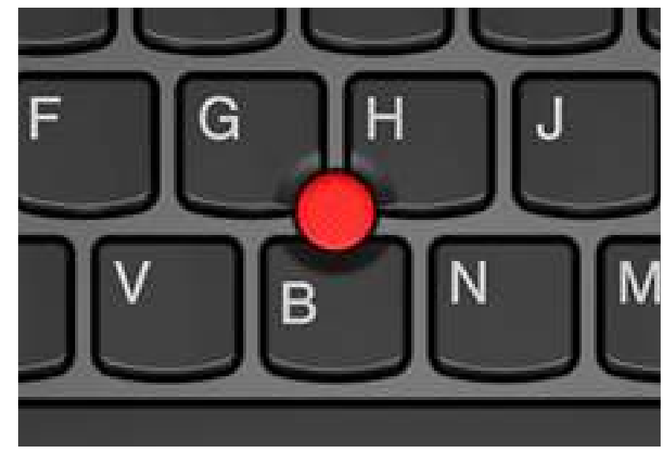
Pointing Stick





Echoed Movements
Pressure Sensitive
Isometric Joystick
Adjustable Settings





ThinkPad

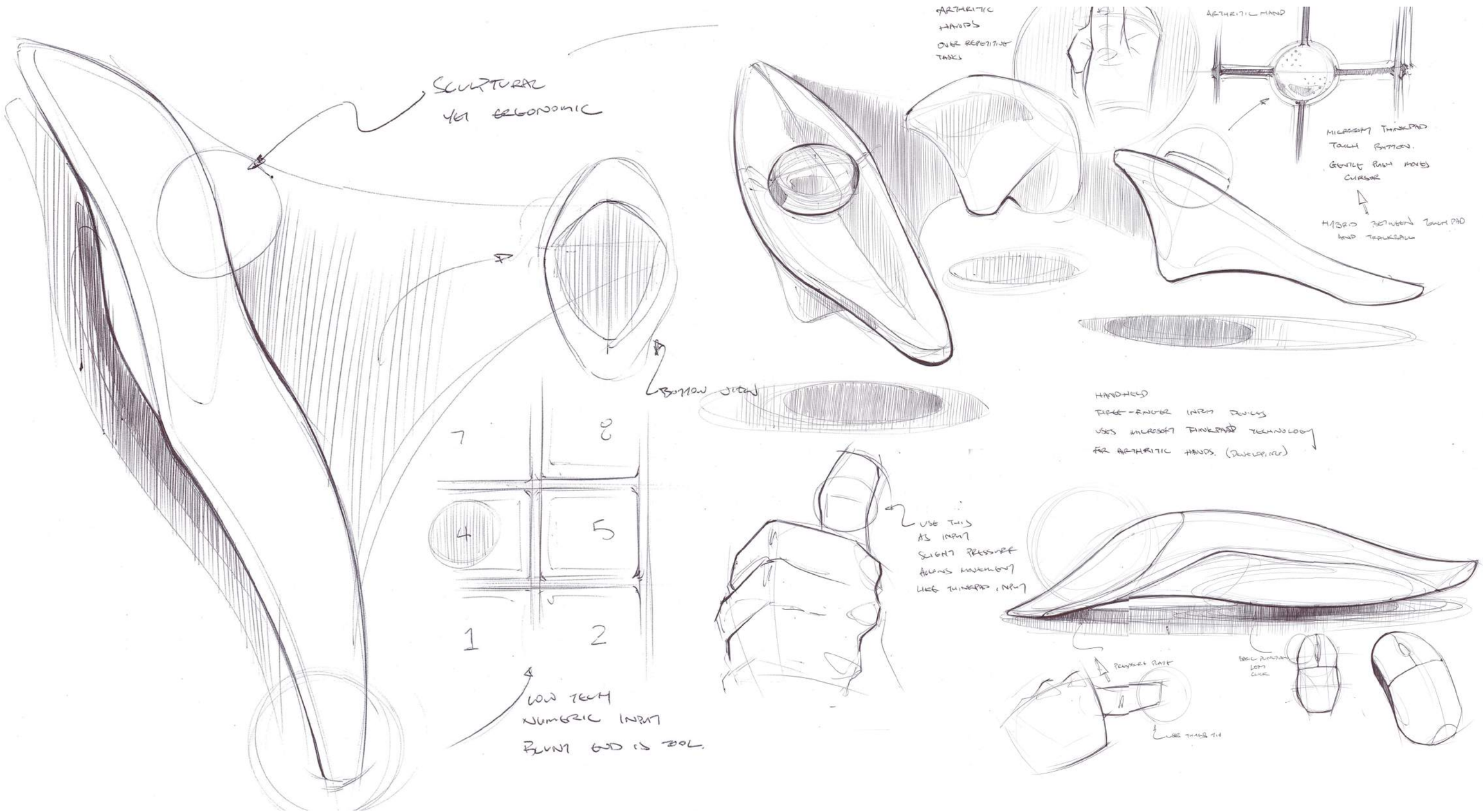
Painpoints

Painpoints	Characteristics
Aesthetically Unpleasing	Most Pointing Input Devices are Aestheticly Pleasing and Looks Dull in Many Environment.
Cheap to the Touch	Many Pointing Input Devices also Feel Dull in the Limited Materials used.
Hard to Hold	Holding a Common Mouse Requires the Hand to Fully Open to use.

Touchpoints

Touchpoints	Key Attractors
Aesthetically Pleasing	Beautiful Form Language That Highlights the User's Hand
Soothing Touch	Variation in Material, Finish, and Textures.
Easy to Hold	Ergonomic, Comfortable, and Arthritis Friendly
Functioning Indicator	LED to Indicate Device's Status
Easy to Input	Focuses Limited Movements of the Hands. Also Incorporates Pressure Sensitive Surface.

Ideation


SCULPTURAL
YET ERGONOMIC
BOTTOM VIEW
ARTHRITIC
HANDS
OVER REPETITIVE
TASKS
ARTHRITIC HAND
MICROSOFT THINKPAD
TOUCH BUTTON.
GENTLE PUSH MOVES
CURSOR
HYBRID TRACKBALL TOUCH PAD
AND TRACKPALM
HANDHELD
THREE-FINGER INPUT DEVICE
USES MICROSOFT THINKPAD TECHNOLOGY
FOR ARTHRITIC HANDS. (DEVELOPMENT)
7
8
4
5
1
2
LOW TECH
NUMERIC INPUT
BLUNT END IS TOOL.
USE THIS
AS INPUT
SLIGHT PRESSURE
ALLOWS MOVEMENT
LIKE THINKPAD INPUT
POINTER PLATE
BASIC FUNCTIONS
LEFT
CLICK

Mock Ups





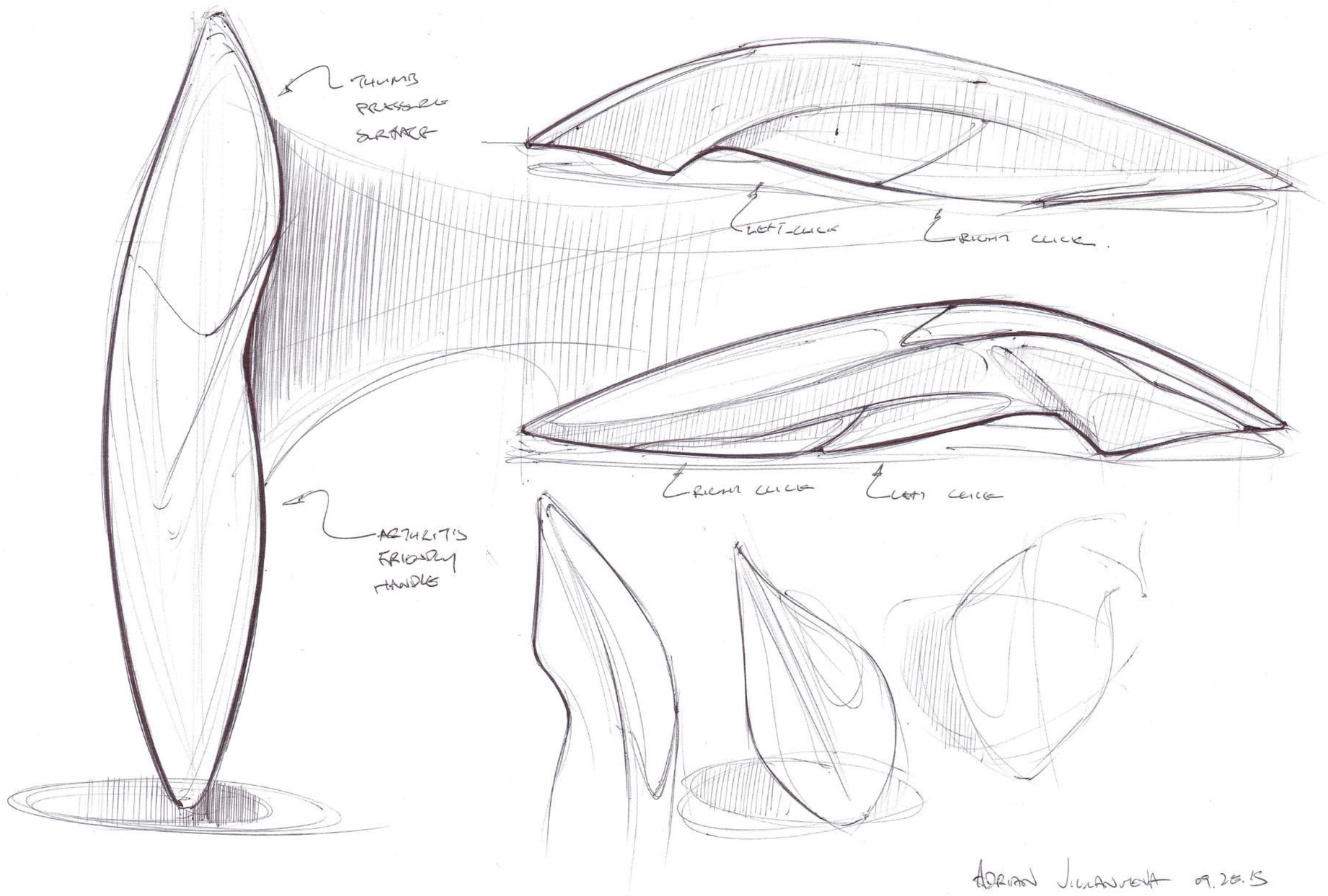








Refinement



Features

Through the process of ideation and refinement, the following features must be included in the final product:

Conform to as Many Possible Arthritic Hand Forms

Easily Placed and Removed from the Hand

Easy typing with Device in the Hand

Extremely Ergonomic

Mirroring Form for the Left Hand

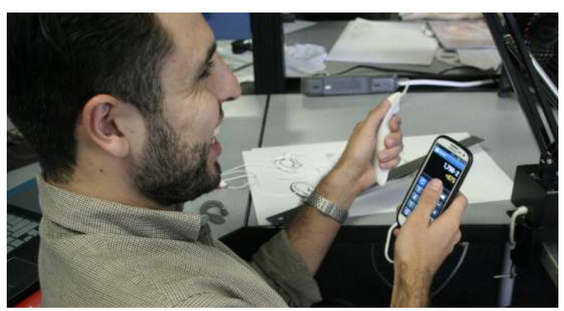
Must include Basic Left Click

Pressure Sensitive Surface for Pointing Input

Variety of Color, Material, and Textures

The listed features will be proved in a prototyped form. Right hand form shown.

Prototype



Peer Comments

Many peers find the form to be extremely comfortable to hold. Since none who tested the prototype did not have arthritis, many prefered using their own fingers for keyboards. In addition, some tested the right-handed prototype on their left hands and found it comfortable. The form is also easily removed and placed into a relaxed hand position.

Nurse Comments

As part of their daily lives, nurses are aware of arthritic conditions to the body. Almost destroying the prototype, the nurse consultant tested the form by tightly squeezing while mocking arthritic hands. Arthritic hands come in many forms, but the key characteristics is the tightening of the overall hand and can constant joint pains. The form was approved by the nurse.

Designer Comments

With the approval of randomly chosen individuals and a nurse consultant, the form is surprisingly comfortable. In addition, a mirrored form, to be used as a set, will allow individuals to use a keyboard easily. Overall, this concept will open new doors to the pointing input device industry .

DAGR

Wield the Cursor

Designed with arthritic conditions in mind, individuals suffering from rheumatoid arthritis can now navigate in all information interfaces again! It is time to take matters into their hands again!

- Arthritis Friendly
- Available Dual Wield
- Easily Held in the Palm
- Pressure Sensing Input
- Silicon Keyboard Thumb

Adrian Po Villanueva
California State University, Long Beach

75% of people with rheumatoid arthritis are of working age

20% with arthritis are forced to change careers

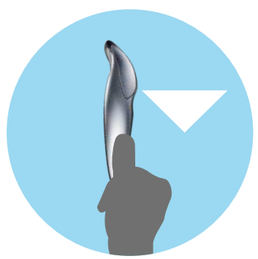
75% with arthritis are women

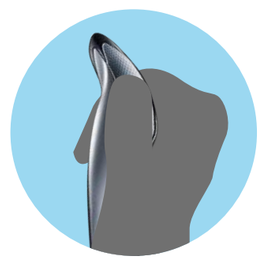
33% with arthritis are forced to stop working within two years

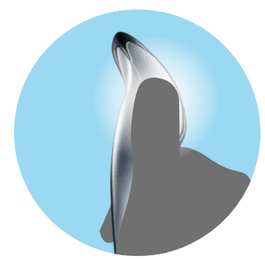
users with arthritis can easily place the device within their grasp without opening and closing their hand

pressure sensitive thumb pad to navigate information systems

the silicon keyboard thumb can be used for keyboards, touchscreens, and trackpads

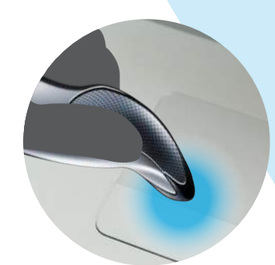






contours of the grip allows the device to rest comfortably in the palm of the hand

With dual wield, users can navigate through an interface and type simultaneously



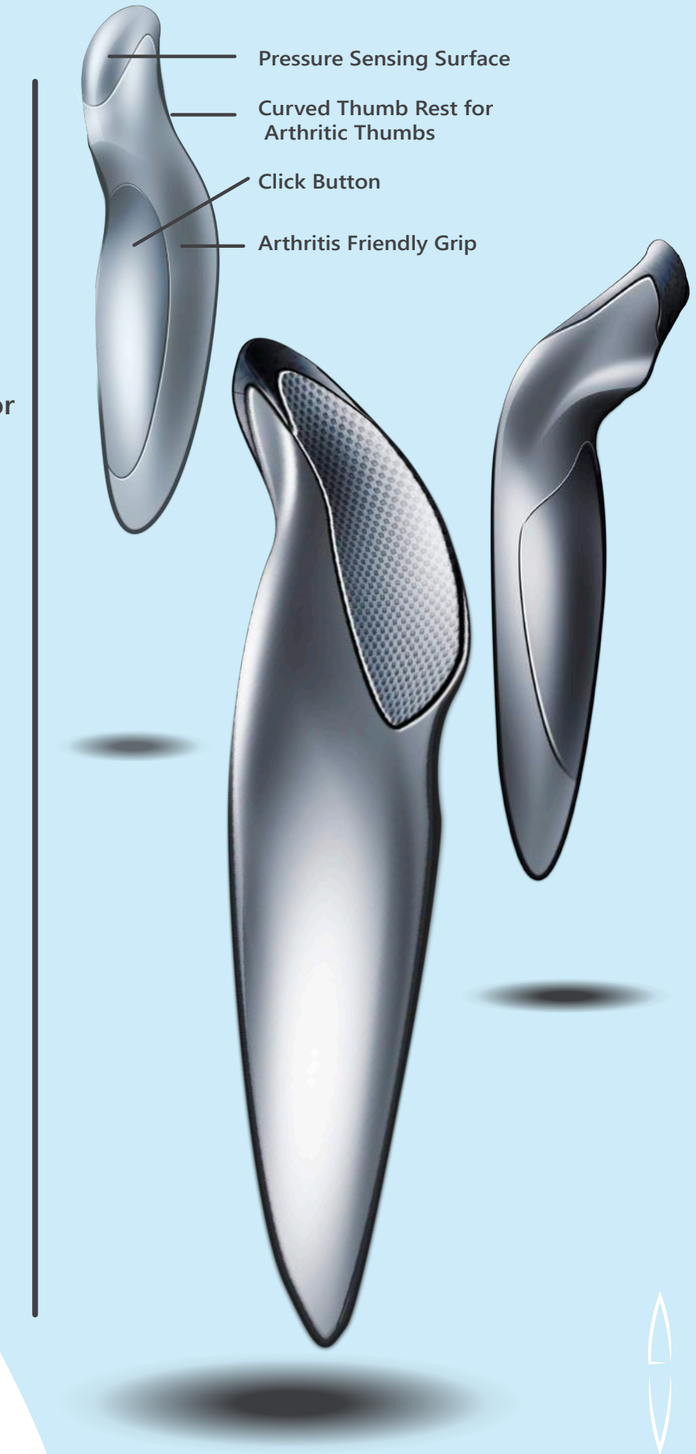


Image References

Handle It Title

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Market: the Accountant

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L Shaped White Wooden Board Office Table With Black Office Chair And White Wooden Board Panel
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Minimalist Used Office Furniture Los Angeles with Modern Office Desks and Storage Solutions
http://www.giesendesign.com/design//minimalist-used-ideas/minimalist-used-office-furniture-los-angeles-with-modern-office-desks-and-storage-solutions-34606.html
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http://www.mortgageloansadvisor.com/what-does-a-bookkeeper-do/

Task

8 Most Common Financial Advising Questions
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Best Savings Advice Ever
http://www.isyourhome.com/uploads/properties/newsletter_pdfs/original/1124/Riverton_on_the_Platte.pdf?1356714936
Stop Outsourcing Payroll Services and Start Using Microsoft Dynamics GP
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The Compilation of Financial Statements
http://blog.wvco.com/tag/compilation-of-financial-statements/
You Need a Budget (and so do I)
http://www.jondale.com/ynab/

Competition

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http://www.ergovancouver.net/mouse_vertical_3m.htm
Delux M618 Wired Vertical Mouse
http://www.dhgate.com/store/product/new-delux-m618lu-m618-wired-vertical-mouse/251484984.html
Dream Machine 2014
http://www.maximumpc.com/dream-machine-2014-1/
Ergonomic Mouse
http://www.techpin.com/tag/ergonomic-mouse/
Logitech Ultrathin Touch Mouse T630
http://www.topnegozi.it/blog/logitech-ultrathin-touch-mouse-t630-ultra-sottile-ultra-preciso-ultra-touch.html
Magic Track Pad
http://www.vecteezy.com/technology/16854-magic-trackpad
Portable Finger Hand Held 4D USB Mini Trackball Mice Mini USB Mouse
http://www.ebay.com/itm/Portable-Finger-Hand-Held-4D-USB-Mini-Trackball-Mice-Mini-USB-Mouse-/151159098317?hash=item2331c8cbcd

Competitive Matrix

Amazon Search: Computer Mouse
http://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias%3Daps&field-keywords=computer+mouse

Ergonomics

Ergonomic Computer Mouse
http://wirelessworld.allalla.com/wireless-world/ergonomic-computer-mouse/
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Hand Pain (Arthritis, Tendonitis, Injuries)
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