
Web Application for Surgeons

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Main Tasks

- We were asked to design a web application for use by surgeons to assist fellow surgeons
- Interface should be simple, easy to navigate
- Users should be able to add steps or tips to procedures
- Adding steps or tips should be quick and easy

Problem statement: Design a simplistic and editable web application for surgeon-use only to assist in surgical education

Old System

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	CTAMUS														
2	Procedural Steps								Procedural Variation	Teaching	Critical Decisions	Attention shifts (looking for frequency or density of shifts of primarily vision)			
3	A	PREPARATION													
4					A1	Insert Foley, drain bladder									
5						To Enter: patient prepped and draped									
6					A1a	Identify the urethra									
7					A1b	Separate labia to visualize structure between clitoris and vagina				Upward Traction with hand retracting labia may help to visualize urethra		urethra			
8					A1c	Place closed ended portion of Foley catheter through urethra into bladder				See image A1b - Better to have hand positioned ventrally to be out of the way for the Foley insertion		foley in one hand;			
9					A1d	Use 10 cc syringe of saline to fill Foley balloon									
10					A1d1	Hold Foley to make sure in far enough				Be sure balloon is beyond urethra					
11					A1d2	At the same time, hold valve to make sure you stabilize									
12					A1e	Visualize urine emptying through catheter									
13					A1e1	Urine drainage stops when bladder is drained									
14						To Exit: Visualize Foley in appropriate location; slight tension to check balloon is filled and secure; no further flow of urine									
15					A2	Mark retropubic exit sites									
16						To Enter: Foley placed									
17					A2a	Identify location to make marks for exit sites									
18					A2a1	Identify pubic bone and retropubic space									
19					A2a2	Identify midline				Encourage junior surgeon to use fingers to curl around pubic bone to identify anatomy (pubic bone, retropubic space); If obese, make sure skin is "neutral", ie not pulling down or pushing up to make marks					
20					A2b	Using a marker place dot or line to identify retropubic exit sites				Use clitoris to help identify midline					
21					A2b1	Mark 2 cm lateral from midline on both sides just cephalad to pubic bone									
22					A2c	Make bilateral stab incision on marked sites				See Image A2b					
23						To Exit: Confirm marks are accurate			Don't make stab incisions (may not always be midline)						

Design

-Our design would consist of three main pages:

- A login screen
- All Surgeries/Procedures Page
- Main page with all the information pertaining to the surgery/procedure.

-The login page is to protect the data on the site so that the general public cannot see or add information

-After logging in, the user should be taken to the search screen where all procedures are listed

-The user can search via a search box or via an alphabet menu

Design Cont.

- The procedure page was originally supposed to have 4 sections (Main steps, Micro steps, Tips and Red Flags)

 - However, the client decided that we should not include red flags, only tips

- The procedure page would have three columns for each section. Originally they were equally sized and individually scrollable.

Process of Design

- After meeting with potential users, we had to change some aspects of our design.
- The users wanted to focus on one specific procedure, however we discussed the usefulness of keeping the functionality for additional procedures. Our final design includes this functionality.
- The procedures page was changed to highlight the “Tips” portion of the screen because this will be their main focus.

User Studies

- Client: Dr. Littleton
- Users: Surgeons in Missouri and the West Coast
- We conducted three interviews/meetings with the client and the potential user.
- Every meeting the requirements changed
- Core functionality of the system remained the same i.e. Tips should be highlighted
- More of a learning/aiding system than implementing in critical scenarios

Task Analysis

Task: View teaching tips associated with various surgery steps

- 1) Login to authenticate
- 2) Search and Select Procedure
 - a) Add Procedures: Done through Edit-A-thon Events
- 3) Follow Main Steps
 - a) Add Main steps while adding procedure, main steps cannot be modified after a procedure is made
- 4) Follow Micro Steps associated with Main Steps
 - a) Add Micro Steps: Submitted for review
- 5) View Teaching tips associated with Micro Steps
 - a) Add Teaching Tips: Submitted for review
- 6) Log out

Plan: 2 -> 3 ->4, follow substeps if needed but not necessary for learning

Procedure Page Draft (Before meeting with users)

LOGO

search

account

MAIN STEPS

Step 1

Do the first step

Step 2

Do the second step

MICROSTEPS

Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



Hello I am a microstep



TIPS

Hello I am a tip

Hello I am a tip

Hello I am a tip


Hello I am a tip

Hello I am a tip

Hello I am a tip

Hello I am a tip

Procedure Page Final (After meeting with users)



Search Other Surgery

Logout

Main Steps

- Insert Foley, drain bladder
- Mark retropubic exit sites
- Injection of local anesthetic into retropubic/suprapubic trocar track spaces bilaterally
- Inject local for paraurethral dissection
- Make incision overlying midurethra – through full thickness of vaginal epithelium and underlying fibromuscular layer
- Paraurethral lateral dissection, to create tunnels for trocar
- Widen paraurethral dissection
- Prepare Sling - Fixed Laxity
- Assemble reusable handle to trocar and sling

Microstep for Step1

Identify the urethra

+

Separate labia to visualize structure between clitoris and vagina

+

Place closed ended portion of Foley catheter through urethra into bladder

+

Use 10 cc syringe of saline to fill Foley balloon

Identify the urethra

Upward Traction with hand retracting labia may help to visualize urethra

+

Separate labia to visualize structure between clitoris and vagina

See image A1b - Better to have hand positioned ventrally to be out of the way for the Foley insertion

+

Use 10 cc syringe of saline to fill Foley balloon

Be sure balloon is beyond urethra

+

Identify pubic bone and retropubic space

Encourage junior surgeon to use fingers to curl around pubic bone to identify anatomy (pubic bone, retropubic space);

+

Identify midline

Use clitoris to help identify midline

+

Using a marker place dot or line to identify retropubic exit sites

See Image A2b

+

Challenges

- Starting from scratch was more time consuming than expected
 - We had to create both front-end design and back-end functionality
- User needs changed continuously from our original design
 - Challenging to meet their needs while also creating a nice-looking and intuitive design
- Wanted to add social rating feature for user-created additions
 - In future versions of this project, this should be added to allow users to rate new steps or tips as good/bad or helpful/unhelpful

Project Demo