

bolle.

The home medical appliance for
COPD patients, to monitor breath
and practise breathing exercises



Product design

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Interaction design

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SITUATION'S INSIGHTS

Few medical professionals know the frustration of being so short of breath you can barely make it to the bathroom and back. *



THE DISEASE

Chronic Obstructive Pulmonary Disease (COPD) is a lung disease that makes it hard to breathe. COPD is most common in people who are older than 60. As COPD gets worse, the person may be short of breath even when doing simple daily tasks.

I found it helpful to learn how many of my prescriptions were “maintenance” drugs aimed at preventing a severe pulmonary “episode”, instead of treating one, after it occurs. *



THE TREATMENT

COPD is non-curable but following strict treatment can help improve breathing over time. The treatment for COPD is a combination of short-acting bronchodilators, long term steroid medicine, regular exercise and breathing exercises on a daily basis over time.

I suddenly realized how much one-on-one attention each of us was getting and how each patient's routine was customized to his/her personal condition, ability, and temperament. *



THE PULMONARY REHABILITATION

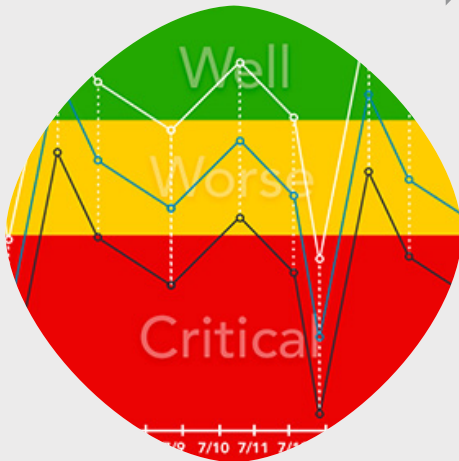
Going to pulmonary rehabilitation is a way to get to know the COPD disease and to learn how to cope with it by training the mind, breath, heart and muscles to get the most out of damaged lungs and to manage living with COPD in one's everyday life.

DESIGN OPPORTUNITIES

I was amazed, when hooked up to the instruments, to get immediate biofeedback and read their effect in actual numbers.*

I found the breathing techniques gave immediate relief to some of my symptoms.*

Success in coping with emotions may well be the single most important element in the management of COPD disease.*



MONITOR PERSONAL PROGRESS

When having COPD, one needs to measure and monitor personal progress on a daily basis, as the peak flow meter collects breathing data that helps the doctor to adjust medication and breathing exercises over time.

PRACTISE BREATHING EXERCISES

One also needs to exercise his/ her lungs with breathing techniques on a daily basis. The breathing techniques are taught by the doctor to the patient during an initial appointment.

MANAGE STRESS

Persons with COPD may feel fear, depression, anger, resentment, frustration and loss of self-esteem.

Breathing sensor

2 microphones measure
inhale and exhale

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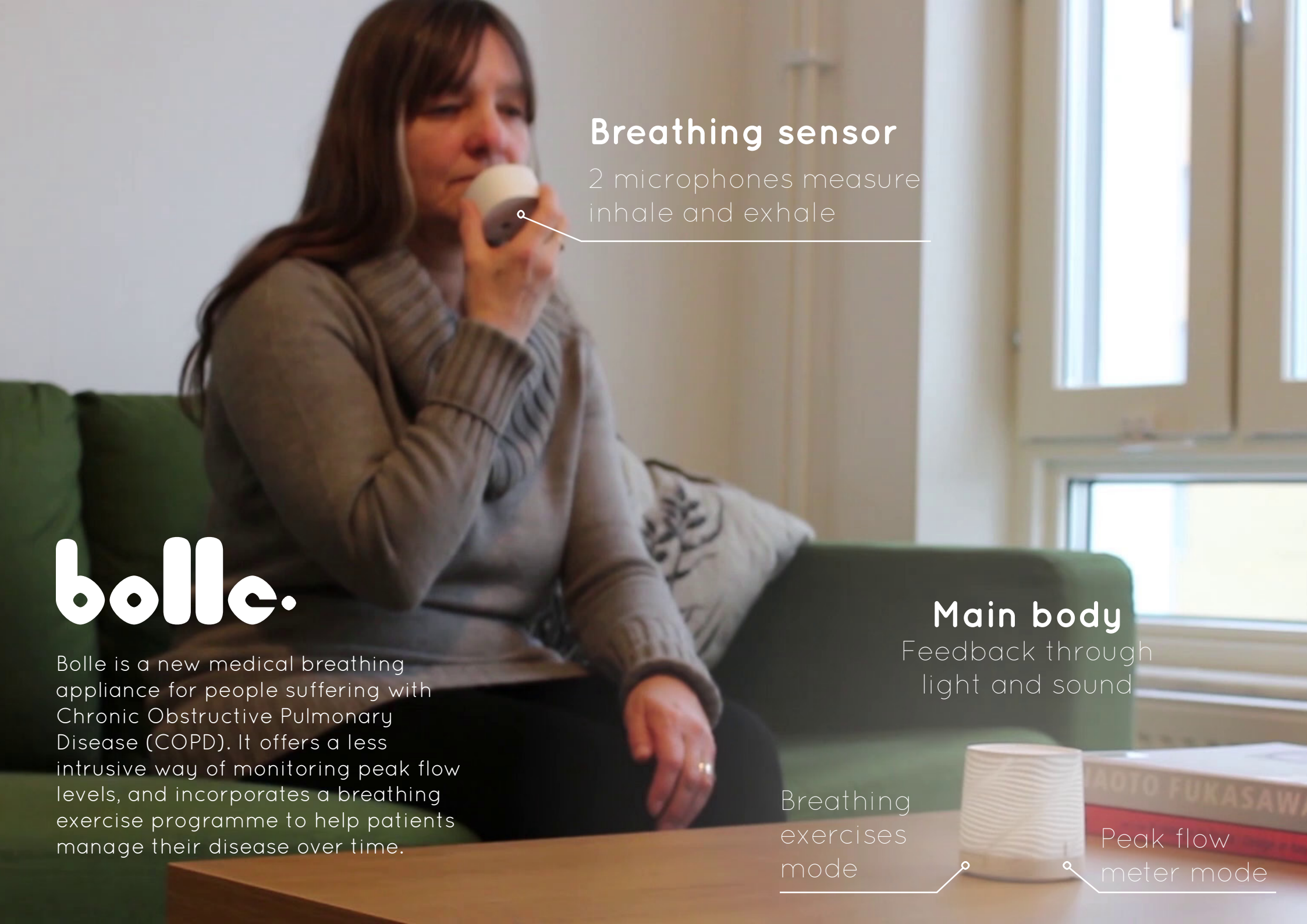
Bolle is a new medical breathing appliance for people suffering with Chronic Obstructive Pulmonary Disease (COPD). It offers a less intrusive way of monitoring peak flow levels, and incorporates a breathing exercise programme to help patients manage their disease over time.

Main body

Feedback through
light and sound

Breathing
exercises
mode

Peak flow
meter mode



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PEAK FLOW MODE

In peak flow mode a short sharp breath is measured. The main body 'fills up' to visually show how close the patient is to their normal airflow levels.

Green zone

Under good control

Yellow zone

Caution

Red zone

Contact doctor





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BREATHING EXERCISES MODE

Bolle guides patients through tailored breathing exercises, giving them a rhythm to match both visually and audibly, therefore removing the worry many people have over whether they are doing them correctly or not.

As progression is made the exercises increase in duration, training the lungs over time.



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BREATHING EXERCISES MODE

The walls of the main body fill and empty in set durations as constructed by the doctor. This makes it easier for patients to keep in rhythm and be confident in the knowledge they are training their lungs correctly and safely.

One rise represents inhale and one fall, exhale.



Breath in & out

Breathing visualization
with wave sounds



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BREATHING EXERCISES MODE

Bolle offers a visual feedback to make the person aware he/she is not on the wave's rhythm, therefore, the person can readjust their breathing flow.

Pulsing yellow

Not in rhythm anymore





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A STRESS-RELIEF MIND TRAVEL

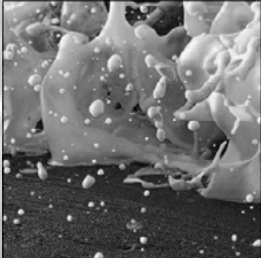
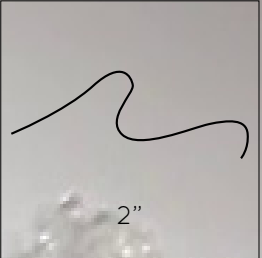
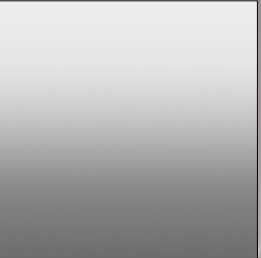

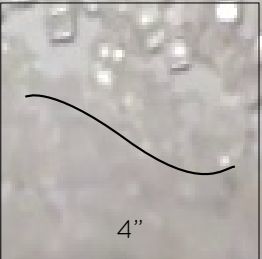
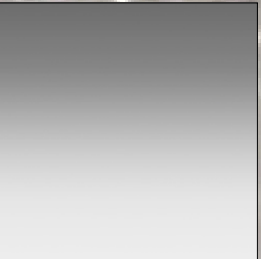
By adjusting your breath to the waves' sound, Bolle helps you train your lungs in a relaxing moment. You do not focus on your disease anymore; instead, your mind travels to the sea and you imagine yourself lying on the sand near the sea shore, your breath is slowly shaped by the sound of the waves approaching and being taken away.



DESIGN PROCESS

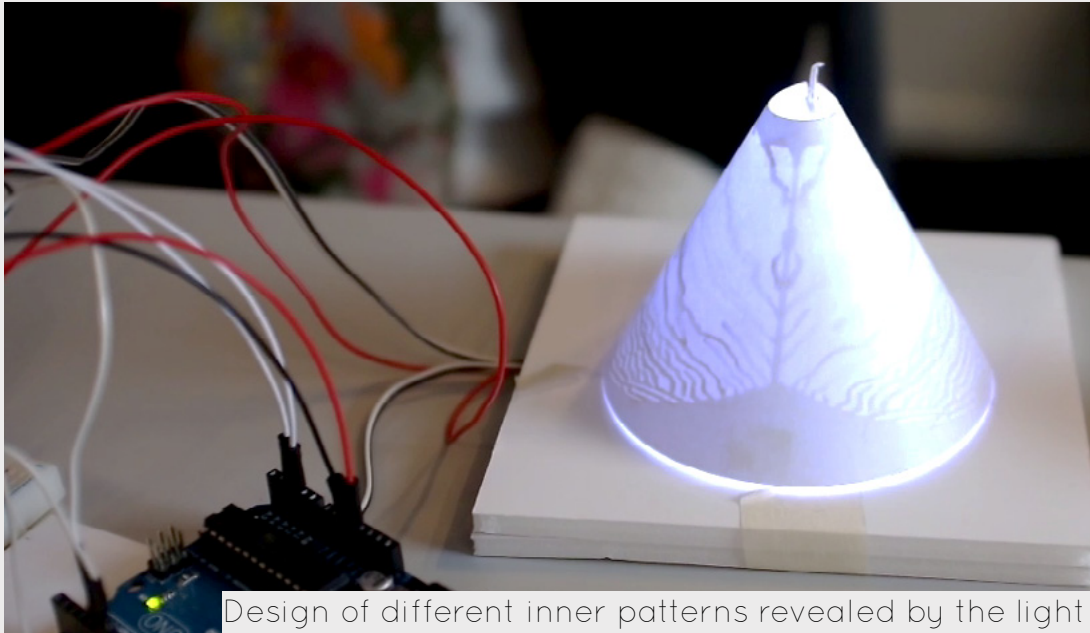
SOUND DESIGN

BREATHING TECHNIQUES MODE: YOU ARE ON THE RIGHT FLOW

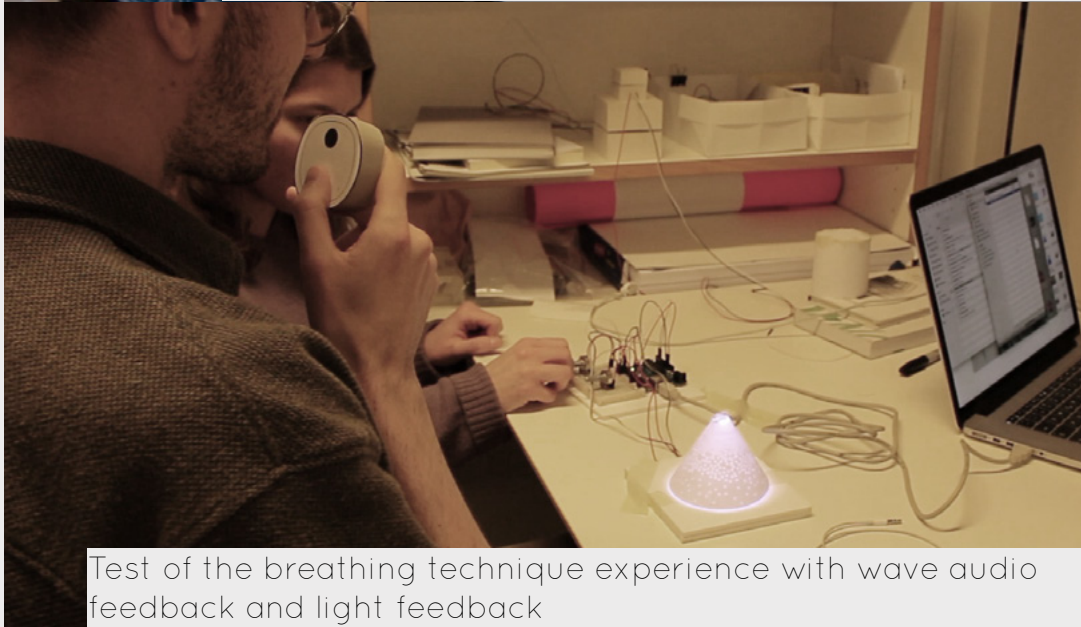
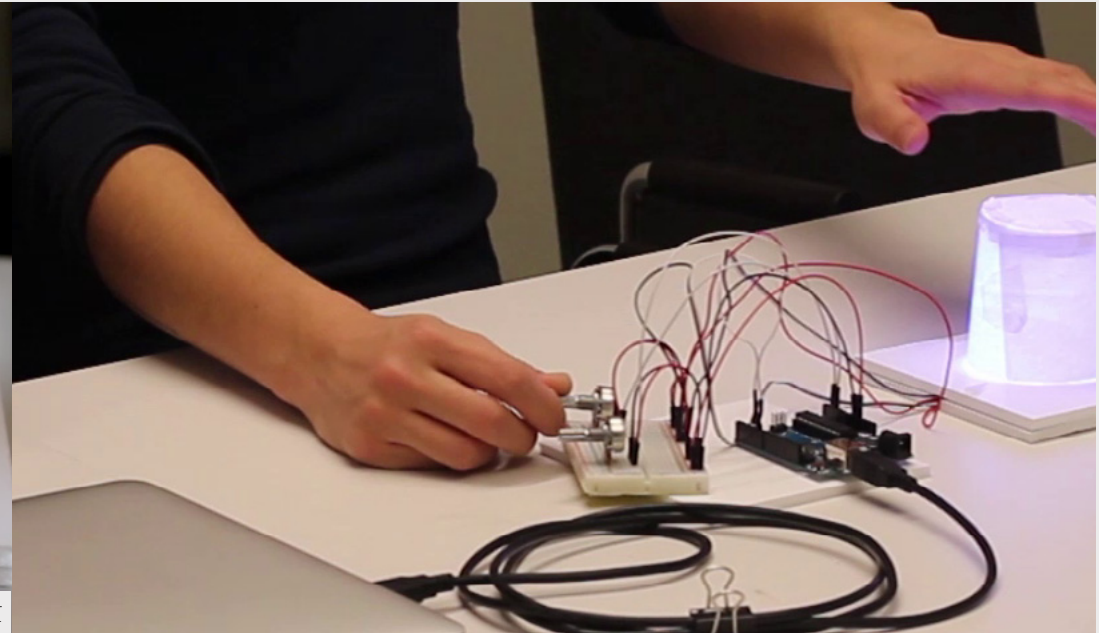
<p>Right breath in (x/sec targeted)</p>		<p>A rounded wave sound that washes ashore</p>			<p>Progressively fading in white</p>
<p>Right breath out (x/sec targeted)</p>		<p>A rounded wave sound that goes away from the shore</p>			<p>Progressively fading out</p>

Extract of the sound board and how we designed the audio feedbacks by recording sounds from everyday life objects. Here some pearls have been used to reproduce waves' sounds.

EXPERIENCE TESTING



Design of different inner patterns revealed by the light

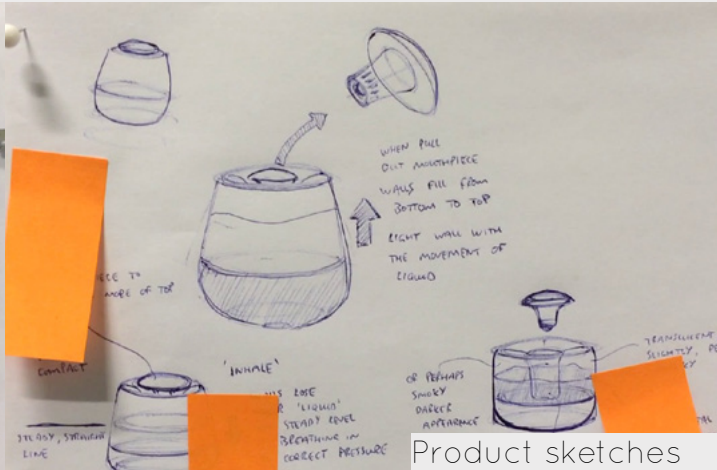
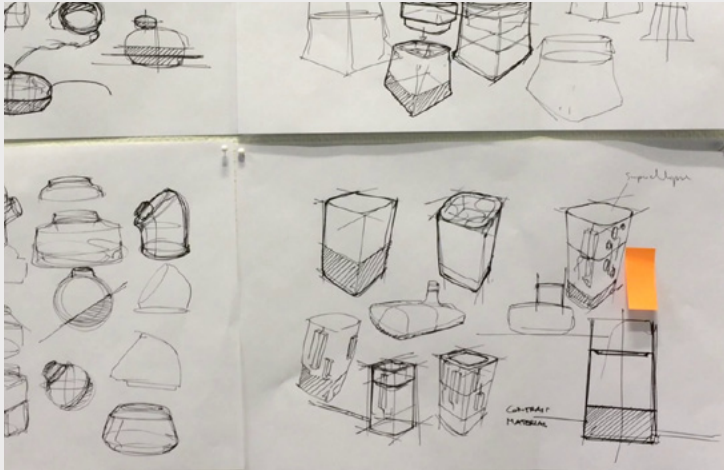


Test of the breathing technique experience with wave audio feedback and light feedback



Test of the breathing in and breathing out mental model with the experience prototype

PRODUCT DESIGN



Product sketches



3D modelling



Model making



Final touch



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