Introduction

Cerebral palsy (CP) is a collection of motor problems and physical disorders related to a brain injury, and usually causes uncontrolled reflex and muscle tightness which can affect a part, side, or the whole body. CP can be linked to several other conditions, including mental retardation, seizures, vision and hearing problems, etc. The origin of CP can be linked to brain injuries occurring during fetal growth, birth, or during the first two to three years of life, however; the cause of the brain injury is usually not known.

Cerebral palsy is one of the most common causes of permanent disability in children and adults. CP occurs in approximately 1.4 to 2.4 of every 1000 people and its frequency of occurrence is equal for men and women. In the United States, there are currently more than 500,000 people with CP.

Since cerebral palsy affects motor control, CP patients have a difficult time with day-to-day activities. Tom Depugh, a CP patient located in Ohio, is an active member at the Passionworks art studio. Painting became one of Mr. Depugh’s favorite pastimes. A recent car accident coupled with CP has severely limited Mr. Depugh’s arm and hand movement and has left him unable to grasp. Also, when seated in a wheelchair, his head and shoulders tend to droop to the left. Providing Mr. Depugh a way to paint again is imperative for his identity, as he wants to contribute to the art studio in every way. Our three part solution is designed to allow Mr Depugh to resume painting.

• Design Objective

The Versatile Painting Solution was designed in order to provide an artist with Cerebral Palsy painting tools. The artist has limited hand movement which regrettably makes painting a troublesome hobby. An automatic paint brush, as well as a support system, was designed to take the difficulty out of mechanical movements so the user can focus on the art that is being created. The support system offers optimized secure positioning. An automated paint brush allows the artist to create works of art without having to dip into paint. By combining these two devices the user is allowed save time and effort in order to pursue canvas painting as a hobby.

The arm support is a comfortable positioning device. It offers support to the upper arm as well as the forearm to ensure stability while painting. The support system is adjustable through 180° on the horizontal, and is also vertically adjustable. The device is wheelchair mountable to make it space economical. A timer is integrated into this support system to remind the user to adjust his positioning to prevent cramping. Since the client will be using an easel to reposition the brush his arm will remain static for long periods of time. After fifteen minutes of painting the artist is alerted with a beep as a reminder to reposition his arm. This keeps sufficient blood flow to the arm and prevents discomfort. The arm support provides structure that will allow the artist to enjoy painting for hours on end.

The paintbrush is automatic in order reduce the number of complicated motions involved in large canvas painting. The paint flows against gravity by means of a variable air compressor. An air compressor allows the unit to be lightweight in comparison to
bulky pumps or heavy motors. The air compressor will be modified to incorporate two switches that will allow the artist to supply more or less air pressure to the brush. The switches will be easily operated with the artist's elbow. The air compressor will supply up to 100 psi in order to move the viscous acrylic paint. Colors will be changed through a cartridge system. This would eliminate troublesome mixing of colors. Each cartridge will contain its own brush. These will lock into the air supply. Rubber rings will be built into the connection to prevent loss of air pressure. The air pressure will contact a lightweight rigid membrane that would apply pressure evenly to the paint and prevent any spattering. The brush will be secured to the arm or support by a Velcro wrist strap. The ultimate feature of this brush is the user's control over the paint flow. This is an important feature that allows the artist to produce the highest quality work.

By integrating this arm support with an automatic paint brush our clients artistic ability is maximized. The system has key important features that are very specific to facilitating the painting process of an individual with hand and lower arm movement restrictions. These provisions for the Versatile Painting Solution include:

- Comfort
- Stability
- Adjustable
- Promote good circulation
- Reduced movement requirements
- User controlled paint flow
- Safety of design

The system satisfies the goal of allowing the artist to utilize simply movements in order to create any work of art that he can visualize.

- **Design Overview:**

  ➢ **Complete Arm Support System**

  The Complete Arm Support provides a comfortable solution to support the arm of an artist who uses a wheelchair. The design of this device provides several major benefits:
It provides a cushioned support for the painting arm, which is adjustable in three axis directions.
The incorporation of multiple friction hinges allows an infinite amount of positions and adjustability.
The position can be adjusted quickly without the use of screws or fasteners.

**Features:**

1.) The wheel chair arm rest-

   The client will mount the complete arm support towards the back of the arm rest on the side of their painting arm. The device makes the arm rest unusable when it is attached, however the device can be easily and quickly removed when the extra support is not necessary.

2.) Screw Clamp Fastening System-

   The device will be clamped to the arm rest of the wheelchair using a screw clamp system. This system was chosen because the positioning of the base of the device can be adjusted along the axis of the arm rest. This provides the device with a greater degree of versatility since its position is more mobile. The clamp system also was chosen.
because it is capable of supporting a sufficient arm weight of about 10kg. When the device is loaded it has an additional moment force, which the clamp system will be able to compensate. Lastly, the clamp allows for a quick and easy removal of the device so that no permanent adjustments of the wheelchair need to be made. The clamp will consist of a modified C clamp, which will have a larger surface attach to the screw in order to prevent slippage. The clamp will also feature a mount attached via a permanent weld. This mount will consist of a steel bar with holes in order to fasten the hinges using a bolt system.

3.) Primary Rotational and Height Adjustment System-

Attached to the clamp housing will feature a conjunction of three connected durable steel friction hinges. These friction hinges will be mounted to provide rotational movement about the clamp, as well as a height adjustment for the main support member. One hinge will be used to allow for 360° rotation, while the other two hinges will be placed in parallel in order to provide sufficient resistance to vertical loading. The hinges will be designed so that the standard weight of the arm will not be sufficient to move the arm support. This friction element will be used to fasten the support in place, but allow adjustability if more force is applied. The friction hinges will be able to operate despite translating bending moments which will be created by the weight of the support system as well as the arm it supports. These hinges will allow for a maximum of 360° degree rotation, and 90° adjustment of height. This will allow for the clamp system to be attached to either side of the wheelchair in order for it to accommodate either arm. Each hinge also pivots to any position and remains in that position until a sufficient force is applied to overcome that its static friction.
The dual Torque Master Friction hinges will be fastened together to provide a moment resistance of 2x100in-lbs. This device will be mounted to the clamp housing as well as to the primary support member.

4.) Length Adjust

The length of the main support member will be adjustable by using two steel tubes consisting of two different sizes. The larger connects to the hinge while the smaller one interconnects to the original. The two sizes will interconnect and allow for positioning adjustment of the entire system in two directions using a screw and wing nut system to fasten the steel tubes in their desired location. Since the Complete Arm Support features several adjustable components, the length adjust would only need to be performed to provide accommodation for different users with different arm sizes. This adjust would only need to be performed once if it is repeatedly used by the same client.

5.) Rotational Fine Adjust

At the end of the main support member, another steel hinge will be incorporated to provide further position adjustability of the Complete Arm Rest. This hinge will require a smaller force to swivel, as opposed to the main base hinge. This allows for the small section of the arm rest to move slightly when a directional force is applied, as requiring movement by the entire device.
6.) Height Fine Adjust

The height will also be adjustable using a screw feature at base of the arm cushion. This will allow for the height of the support to be adjusted while keeping the angle and the length of the main support member constant.

7-8.) Arm Cushions

An arm cushion is placed at the end of the support members in order to provide comfortable contact with the arm. Pyrell Polyurethane will be used for the cushioning material. This polymeric cushioning system was chosen because it is capable of contouring to the body because of its deflection at small pressures (only .7 Psi yields a 25% deflection). The cushioning contours to the body for comfort purposes. It will dissipate the stress forces over the largest possible area. Any pressure points created by the support members will be dissipated by the cushioning. The polyurethane cushioning will be encased in a durable cloth covering to minimize abrasiveness and reduce tissue irritation.

➢ **Automatic Dispensing Paintbrush**

The automatic dispensing paintbrush allows the client to paint a wide canvas area without continuously adjusting arm positions to refill the paint on the paintbrush. This system automatically dispenses paint onto the paintbrush bristles using a pressure sensitive switch. The design of this device provides many key benefits:

- Allows adjustable paint flow by controlling the air pressure produced by the air compressor
- Easy interchangeable paint brush units allow the use of many different paint colors
- The force of air pressure allows paint to flow against gravity
Features:

1.) Air Compressor-

The force of air will drive the flow of paint. Air pressure will force the paint located in the brush compartment out of the compartment to the bristles of the paint brush. Controlling the air pressure will control the flow of paint. As pressure increases, the paint flow increases and as pressure decreases, the paint flow decreases. The air pressure needed to control the flow of paint will be produced and controlled by an air compressor. The air compressor necessary for this current design must provide a pressure range from 0 psi to 100 psi; this pressure range will be controlled by a pressure sensitive switch.

There are many air compressors on the market which could be integrated into this current design, however, they do not all meet the exact needs of the design. The SIMAIR TC2000 Compressor is an airbrush compressor which meets the needs of our current design. The TC2000 is a quiet running air compressor that utilizes a two-cylinder piston design to provide 1.2 cubic feet per minute of air output. This air compressor has a pressure range from 0-80 psi, with an optimal working pressure around 40 psi. The pressure is then controlled using a large pressure sensitive switch, which can be used by the client and controlled by foot or hand. A feature of this design that isn’t necessary but is beneficial is the high efficiency moisture control system. This system ensures that dry air is delivered even in moist humid conditions. The TC2000 retails for around $195.00 but can be found online for around $120.00. Although expensive, it is a major component of our design.
2.) Tubing

This design calls for some sort of tubing to run from the compressor to the brush, to allow the air pressure to force the paint out of the brush onto the drawing canvas. By calculation, a 1/4” inner-diameter tubing will be needed to provide the proper air flow and air pressure. This tubing must be strong enough to handle the maximum working pressure of the air. For this design, Teflon FEP is the material of choice. This tubing has an inner diameter of 1/4” and an outer diameter of 3/8”. It has an operating temperature range of -100°F to 400°F, and a tensile strength of 3400 psi, which is more than enough for the current application. Teflon FEP is around $4.29 per foot, which is relatively cheap considering its purpose. Fahrenheit

3.) Coupling System

This design calls for a coupling system to couple the air hose from the compressor to the brush unit. Due to the versatility of this design and the use of many different brushes, one for each color, this coupling system must be fast and efficient. The coupling system must also have the ability to handle the air pressure which the compressor produces, without letting any pressure escape when changing brushes. The couplings best suited for this design are chrome-plated quick couplings produced by Omega. These quick couplings are appropriately used with airlines and provide excellent service at high pressures. They have a maximum working pressure of 250 psi, which is more than enough for the current design. They operate best at -40°F to 180°F and have the proper tube size diameter for 1/4”. The female end of the coupling is around $15.00 and the male ends of the couplings are around $10.00.

4.) Brush Unit

An essential component in this design is the brush unit. The brush unit is the final portion of the design where the paint is stored and where the brush bristles are attached. This unit must be strong enough to handle the pressure produced from the air, and it must also be hollow so that it can store the paint. The best material for this current design is extruded acrylic, a form of PVC. To decrease the amount of pressure change based on cross sectional area, an inner diameter of 1/4” will be used. A piece of acrylic PVC with an inner diameter of 1/4” and a height of 5” will allow for the storage of enough acrylic paint so that the artist can constantly draw without having to refill the paint on a regular basis. This material is clear with no tint, so the paint level can be monitored, and it has an operating temperature range from 30°F to 160°F. This acrylic has a tensile strength of 9600 psi, therefore, it can handle the loads imposed upon it by the air pressure. This extruded acrylic costs $3.30 for a six foot section. Attached to the end of the acrylic will be the brush bristles. These will be made of nylon so that they will clean easily.
Figure 1.4 – Schematic showing the workings of the brush unit

- **Parts List and Budget:**

  ➢ *Table 2.1 – Complete Arm Support Part List*

<table>
<thead>
<tr>
<th>Components</th>
<th>Cost</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyrell Polyurethane Open Cell Foam Sheets (2sq ft.)</td>
<td>$9.49 per Sq. ft</td>
<td>Temperature Range: -40° - 225° F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Density: 2 lbs/cu. ft.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compression: 25% deflection at .7 Psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thickness: in.</td>
</tr>
<tr>
<td>Durable Cover Cloth (TBD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 5 bolts (TBD)</td>
<td>8$ per 25</td>
<td>Strength: 120ksi</td>
</tr>
</tbody>
</table>

9
<table>
<thead>
<tr>
<th><strong>Steel Square 5/8 x 5/8</strong></th>
<th><strong>$18.95 per 3ft</strong></th>
<th><strong>Ultimate Strength</strong></th>
<th>58ksi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Yielding Strength</strong></td>
<td>36ksi</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Material:</strong></td>
<td>General Purpose Low Carbon Steel, 4130 Alloy Steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Wall Thickness:</strong></td>
<td>.0350&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Steel Square 3/4 x 3/4</strong></th>
<th><strong>$21.02 per 3ft</strong></th>
<th><strong>Ultimate Strength</strong></th>
<th>58ksi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Yielding Strength</strong></td>
<td>36ksi</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Material:</strong></td>
<td>General Purpose Low Carbon Steel, 4130 Alloy Steel</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Wall Thickness:</strong></td>
<td>.0350&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Torque Master Adjustable Friction Hinges (3)</strong></th>
<th><strong>$45 Each</strong></th>
<th><strong>Torque Range:</strong></th>
<th>Adjustable to 100in*lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Rotation:</strong></td>
<td>360°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>C – Clamp (1)</strong></th>
<th><strong>$11.98</strong></th>
<th><strong>Size</strong></th>
<th>3” , 9/16 screw diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Holding Capacity</strong></td>
<td>3000lbs</td>
</tr>
</tbody>
</table>

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**Table 2.2 – Automatic Dispensing Paintbrush Parts list**

<table>
<thead>
<tr>
<th><strong>Components</strong></th>
<th><strong>Cost</strong></th>
<th><strong>Properties</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMAIR TC2000 Compressor</td>
<td>$120.00</td>
<td>Max. Pressure: 80 psi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Airflow: 1.14 cfm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size: 10” x 6” x 6”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power: 1/6 hp</td>
</tr>
<tr>
<td>Teflon FEP</td>
<td>$4.29 per foot</td>
<td>Tensile Strength: 3400 psi</td>
</tr>
<tr>
<td>Chrome-Plated Quick Coupling</td>
<td>male: $10.00</td>
<td>Max. Pressure: 250 psi</td>
</tr>
<tr>
<td></td>
<td>Female: $15.00</td>
<td>Operating Temp.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube diameter: 1/4”</td>
</tr>
<tr>
<td>Acrylic PVC</td>
<td>$3.30 for 6'</td>
<td>Operating Temp.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Size: inner diameter: 1/4”, outer diameter: 1/2”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tensile Strength: 9600 psi</td>
</tr>
</tbody>
</table>
• **Technical Analysis:**

➢ **Vertical Loading of Complete Arm Support:**

The Following Assumptions were made using data from an anthropomorphic data table*

*Data Table 9.1 -Introduction to Biomedical Engineering, Enderle, Blanchard, Bronzino et al. pg. 431

Assume:

• The Complete Arm Support is mounted parallel to the torso towards the rear of the wheelchair arm rest.
• The maximum angle at which the arm will be positioned is 90°, which is at complete arm extension.
• The average angle at which the arm will be extended during use is at a 60° angle with the shoulder joint.
• The average length full arm length is 24.8in
• Assuming the largest user is 300lbs, an anthropometric data table yields a total arm mass of 5% total body weight. The center of mass of the total arm is 53% of the length from the proximal end.
• The weight of the brush and of the device are not considered in the diagrams, however the maximum allowable weight will be calculated.

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**Figure 3.1 – Complete Arm Support Biomechanics at 90° Angle**

At full extension of the arm, the maximum moment about the Z-axis will be generated. This moment must be compensated by the friction hinges in order to keep the system in static equilibrium and provide support for the arm. The extremity produces an
overall moment of 186 in-lbs. Since each of the Torque Master adjustable steel friction hinges have a maximum of 100in*lbs each, two will be mounted in parallel in regard to movement in the Y-axis. This will double the overall moment and produce a total moment of up to 200in*lbs before the hinge system will yield. This provides an effective means of stability since it is unlikely that a person of 300lbs will be using the Complete Arm Support. Since the client is 180lbs, the friction hinges provide over twice the maximum moment necessary to produce a static system.

\[ M_X = (\text{Upper Arm Length}) \times (5\%) \times (\text{Body Weight}) + (\text{Hinge Moment}) = 0 \]

\[ M_X = (24.8\text{in}/2) \times (.05) \times (250\text{lbs}) + (\text{Hinge Moment}) = 0 \]

Hinge Moment = 155 in-lbs
As the angle of the arm decreases, the moment caused by the arm also decreases. This is because the length of the upper arm is decreasing in the X direction. As this length decreases, the moment also decreases in a linear proportion. When the client uses the Complete arm Support for painting, there will be an angle between 0-90° and generally an average of about 60° since painting at full extension is an uncomfortable position. The free body diagram in figure 4.2 demonstrates the drop of the moment as the angle formed by the shoulder and torso is decreased. This data supports the fact that two 100in-lbs friction hinges would be suitable for all arm positions.
\[ M_x = (\text{Upper Arm Length}) \times (\sin 60) \times (5\%) \times (\text{Body Weight}) + (\text{Hinge Moment}) = 0 \]

\[ M_x = (24.8\text{in}/2) \times (\sin 60) \times (.05)(250\text{lbs}) + (\text{Hinge Moment}) = 0 \]

Hinge Moment = \text{134.23 in-lbs}

**Other Variables:**

The weight of the brush and the device also impose a moment on the system. The maximum allowable moment caused by these aspects at maximum arm extension (90°) would be:

\[(\text{Maximum Hinge Moment Capability}) - (\text{Moment of Arm}) = (\text{Maximum Device Moment})\]

\[(200 \text{ in-lbs}) - (155 \text{ in-lbs}) = \text{45 in-lbs}\]

If the following Assumptions are made then the maximum allowable weight of the brush and support device can be calculated.

Assume:
- The center of mass of the support and brush is at 3% of the total arm length.
- The arm is at full extension (maximum moment)
(Maximum Device Moment) / (Length to Centroid) = Maximum Device Weight

(45 in-lbs) / (24.8in*.3) = 6.05 lbs

This would allow the device and brush to have a weight of 6.05lbs before the moment would overcome the resistance of the friction hinges and force the system out of static equilibrium. This should be more than a sufficient weight for a paint brush and support system. It is important to reiterate that these conditions are at maximum circumstances which will create the largest moment, such as including initial conditions of a 250lb user with full arm extension. Under normal use there would be more frictional force in reserve under loading, which would prevent the position of the device from yielding.

**Positioning Adjustment of Complete Arm Support:**

The position of this device will also feature a friction hinge which will allow rotation about the Y-axis. This hinge will not support a moment caused by a vertical loading, but will serve to hold the position of the support constant in the X-Z plane. Although gravity does not encourage arm movement in the horizontal direction, accidental shoulder movements could cause the rotation if the device if a standard hinge is used. The constant movement of the support position would be problematic if some degree of friction is not imposed on hinge which is mounted to allow rotation. This hinge would need to withstand a maximum moment of about 60in-lbs. Therefore one adjustable 100in-lbs hinge can be used and adjusted to find the proper balance for position adjustment and stability.

Since safety and reliability are the first and foremost design standards of the support system, a biomechanical static analysis has been performed to ensure that the system can sufficiently tolerate the forces imposed upon it by a user of up to 300lbs (136kg).

- **Calculation of Acrylic Paint Flow Rate:**

The paint compartment was analyzed in order to obtain a flow rate. See figure 3.5. The cylinder is filled with paint at a viscosity of around 98,000 cp. Viscosity is a measure of force per unit of area. With this known, the flow rate was calculated based on the difference in pressure delivered by the compressor and the pressure exerted on the tip by the atmosphere. Poiseuille’s law was applied to the system in order to determine the velocity of the flowing paint at two compressor pressures. The calculation of velocity was done at the maximum pressure and then the typical operating pressure proving that
the compressed air supply is more than sufficient. The flow rate based on the following
calculations ranges from .429-1.83 cc/sec at theoretical and average maximum pressures.
Acrylic paint is used sparingly; this is a sufficient flow rate for the application.
Furthermore, the flow rate will be able to be adjusted to lower velocities at the discretion
of the artist. This low velocity flow allows the user to apply the perfect amount of paint to
the canvas.

Using Poiseuille's Law of the Flow of Liquids through a Tube:

Where:
l = the length of the tube in cm
r = the radius of the tube in cm
p = the difference in pressure of the two ends of the tube in dynes per cm²
c = the coefficient of Viscosity in poises (dyne-seconds per cm²)
\( v \) = volume in cm³ per second

Then:
\[
\frac{\pi r^4 p}{8 c l}
\]

Assume a compressor operating at maximum pressure = 80 psi
Assume 10 cm of tubing filled with paint
\( r = 1/8'' = .3175 \) cm
\( p = (80-\text{atmospheric})\text{psi} = (80-14.7)6.8927E4 \) dyne-seconds per cm² = 4.5009 E6
\( c = 98,000 \text{ cp} = 980 \text{ poises} \)
\( l = 10 \) cm

\[
\frac{\pi (.3175)^4 (4.5E6)/(8*980*10)}{1.83 \text{ cm}^3 \text{ per second}}
\]

Same calculation with compressors operating at typical working pressure = 35 psi

\[
\frac{\pi(.3175)^4(4.5E6)(8*980*10)}{1.83 \text{ cm}^3 \text{ per second}} = .429 \text{ cm}^3 \text{ per second}
\]
$P_{\text{max}} = 80 \text{ psi}$
$P_{\text{ave}} = 35 \text{ psi}$

$V_{\text{max}} = 1.83 \text{ cc/sec}$
$V_{\text{ave}} = 0.429 \text{ cc/sec}$

$R = 0.3175 \text{ cm}$
$L = 10 \text{ cm}$

Viscosity = 980 poises

Figure 3.5: Paint filler tube
Block Diagram 4.1 – Analysis of Complete Arm Support Function

Is moment greater than 200 in·lb? [YES/NO]

YES

Is height position satisfactory? [YES/NO]

NO

Support remains static

NO

Is rotational positioning satisfactory? [YES/NO]

YES

No user adjustment

NO

Vertical movement permitted

YES

No user adjustment

NO

Swivel movement permitted
Block Diagram 4.2 – Analysis of Paint Brush Operation

User Initiates Painting

More paint is required to brush
User operates more switch
Pressure is increased

Less paint is required to brush
User operates less switch
Pressure is decreased

New color is required
Turn off air compressor
Remove brush by operating quick release
Snap in new brush
Turn on compressor
• Conclusion

The combination of the arm support system and the automatic paint dispensing brush will enhance the painting experience for our client and other users with cerebral palsy. The Complete Arm Support System is designed to support the user’s arm without sacrificing any range of motion. Users with limited range of motion as well as users with complete range of motion will benefit from this design. Users with limited range of motion in their arms tend to rotate out at their elbows to achieve as much range of motion as possible. This design allows the user to rotate in this manner while still providing the necessary support.

The Complete Arm Support System, coupled with the automatic paint dispensing paint brush will provide an unsurpassed painting experience for our client. The automatic dispensing paint brush allows the client to paint for extended periods of time without having to re-apply paint to the brush manually. Applying paint to the brush is achieved using an air compressor, with the amount of paint applied varying based on the amount of air pressure used. This system is easy to use, and permits the user to paint with many different colors with ease. These designs meet the specifications for the client to effortlessly paint again.