Oral Food Challenges in an Office Setting

S. Allan Bock, MD
National Jewish Health and Boulder Valley Asthma and Allergy Clinic, University of Colorado, Denver School of Medicine, Boulder, California
Faculty Disclosure for
S. Allan Bock, MD

For the 12 months preceding this CME activity, I disclose the following types of financial relationships:

Honoraria received from: None
Consulted for: None
Held common stock in: None
Research, clinical trial, or drug study funds received from: None

I will not be discussing products that are investigational or not labeled for the use under discussion.
Disclosures

• Employer: Boulder Valley Asthma and Allergy Clinic

• Academic Affiliations:
  • Consulting Staff in Pediatric Allergy, National Jewish Health, Denver
  • Clinical Professor, Dept. of Pediatrics University of Colorado, Denver, School of Medicine.

• Member: Medical Advisory Board – Food Allergy Research and Education (FARE)
• I have no current financial or industry conflicts or relationships to disclose
No doubt a drop of truth may rarely be tossed up from the depths of a sea of folly, but a dependable means is needed to pick out a drop of sense in a spray on nonsense. For this purpose, the success of the scientific method places it will above empiricism.

*Charles D. May, M.D. 1975*

[Allergy: Principles and Practice (First edition)]
CHALLENGE GOALS

• To determine if symptoms can actually be produced.
• To reproduce the symptoms as described in the history.
• To determine the dose causing symptoms.
Office Food Challenge Materials

1. A scale (triple beam balance works well)
2. Mortar and pestle; Coffee grinder, food processor
Office Food Challenge Materials

3. Foods (nuts, seeds, spices, dry milk, dried egg white, others)

4. Score sheets

5. Have families bring most of the challenge material and vehicle
Office Food Challenge
Supervision

Have a dedicated nurse perform the challenges including:
Weighing and measuring.
Handing out each challenge portion.
Asking about symptoms before each portion is given to subject.
Recording score before each portion.
Notify physician of any symptoms occur.
**VEHICLES** *(Must be *specific* allergen free!)*

<table>
<thead>
<tr>
<th>Capsules (rarely)</th>
<th>Hamburger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant Formula</td>
<td>Tuna Fish</td>
</tr>
<tr>
<td>Applesauce</td>
<td>Ice Cream (grape)</td>
</tr>
<tr>
<td>Neocate ®</td>
<td>Popsicles</td>
</tr>
<tr>
<td>Milk Shakes</td>
<td>Lentil Soup</td>
</tr>
<tr>
<td>Chocolate Pudding</td>
<td>Mashed Potato</td>
</tr>
<tr>
<td>Tapioca Fruit Mixture</td>
<td>Cereal</td>
</tr>
<tr>
<td>Grape Juice</td>
<td>Elecare ®</td>
</tr>
<tr>
<td>Baked Recipes</td>
<td></td>
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</tbody>
</table>
HISTORY TO BE OBTAINED FROM A SUBJECT REPORTING AN ADVERSE REACTION TO A FOOD

- Description of symptoms and signs
- Timing from ingestion to onset of symptoms
- Frequency with which reactions have occurred
- Time of most recent occurrence
- Quantity of food required to evoke a reaction
- Associated factors (activity, meds)
HISTORY TO BE OBTAINED FROM A SUBJECT REPORTING AN ADVERSE REACTION TO A FOOD

- Be sure to maintain details for each food.
- Often patients/parents want to gloss over details saying that each reaction is the same.
- When the history is very complex it may be necessary to have the patient/parents work on the details at home. (Pt with multiple problems).
Look for stigmata of allergic disease:

- **SKIN**: atopic dermatitis, urticaria, angioedema
- **RESIRATORY SYSTEM**: nose, chest, [eyes]
- **GASTROINTESTINAL SYSTEM**
<table>
<thead>
<tr>
<th>PLACEBOS {Must be specific allergen free!}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dextrose</td>
</tr>
<tr>
<td>Wheat Flour</td>
</tr>
<tr>
<td>Rice Flour</td>
</tr>
<tr>
<td>Nut Flours</td>
</tr>
<tr>
<td>Canned Tuna</td>
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</table>
PERFORMING CHALLENGES

1. Identify the likely foods.
2. Determine the smallest amount likely to cause symptoms.
3. Use one quarter or less of the suspected amount for the initial dose. [We usually start at .5 gm]
PERFORMING CHALLENGES (CON’T)

4. Allow an adequate interval between challenges (usually 20-30 min for a total of 5 portions)

5. Use an adequate placebo (or not now most docs use open challenge protocols).

6. Observe the subject very closely at frequent intervals.

7. Have baseline measurements of vital signs, wt, and spirometry.
8. An indwelling intravenous line is rarely necessary.

9. Determine whether exercise / other additional stimulus is a cofactor (alcohol, anti GER meds)

10. Challenge with entire meal (plus stimulus?).
PERFORMING CHALLENGES (CON’T)

11. If single doses over several days are required, give the dose under observation each morning and have the patient return when symptoms occur.

12. If multiple doses over several days are required, give the amount necessary as described by the patient, 2 or 3 times per day.
OFFICE CHALLENGES

Scoring systems for immediate and delayed symptoms will be different, behavior rating scores may be used.
CHALLENGE INTERPRETATION

Positive: unequivocal symptoms

Negative: food back in the diet

Equivocal: subjective reaction or complaints; reaction too likely to reintroduce food to diet immediately (DBPCFC required)
When the challenge is complete

• Review the results.
• Encourage pt to be with parents or another adult.
• Suggest they go home after challenge.
• If going to school be sure that teacher knows that there was a challenge.
• Epi available (should be brought to challenge visit)
• No further challenge food that day, then into the diet starting the next day.
<table>
<thead>
<tr>
<th>Food</th>
<th>Challenge material</th>
<th>Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg</td>
<td>Dried Egg white, Chopped hard boiled egg</td>
<td>Mashed potato, oatmeal, applesauce yogurt, pudding</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
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<tr>
<td>----------------</td>
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</tr>
<tr>
<td>Cow’s milk</td>
<td>Non-fat dried milk, Skin milk</td>
<td>Rice, soy milks, Infant formula, Applesauce, Milk-free pudding</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>Wheat</td>
<td>Whole wheat flour, crushed up saltine crackers</td>
<td>Applesauce, oatmeal, rice cereal, mashed potato, chocolate pudding</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
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<tr>
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<td>--------------------------------</td>
</tr>
<tr>
<td>Soy</td>
<td>Soy flour, Soy formula</td>
<td>Rice milk, safe formula, elemental formula, cow milk, pudding</td>
</tr>
</tbody>
</table>
**Foods & Vehicles for Challenges**

<table>
<thead>
<tr>
<th>Food</th>
<th>Challenge material</th>
<th>vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanut</td>
<td>Peanut flour (ground or crushed)</td>
<td>Oatmeal, chocolate pudding, Hamburger</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------</td>
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</tr>
<tr>
<td>Tree nuts</td>
<td>Crushed suspected nut (preferably from the shell) [not always available]</td>
<td>Peanut butter, Chocolate pudding, Hamburger</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Fish/Shellfish</td>
<td>Suspected fish or shellfish</td>
<td>Safe fish “patties” Canned tuna Grape flavored Ice cream</td>
</tr>
</tbody>
</table>
# Challenging Challenges

<table>
<thead>
<tr>
<th>Food</th>
<th>Challenge material</th>
<th>Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyes</td>
<td>Food coloring: single/multiple</td>
<td>Capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grape juice</td>
</tr>
<tr>
<td>Aspartame</td>
<td>Aspartame Equal ®</td>
<td>Capsules</td>
</tr>
<tr>
<td>Preservatives</td>
<td>Na Benzoate, BHA, BHT</td>
<td>Capsules</td>
</tr>
<tr>
<td>Food</td>
<td>Challenge material</td>
<td>Vehicle</td>
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<tr>
<td>-------------------</td>
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<td>--------------------------</td>
</tr>
<tr>
<td>MSG</td>
<td>MSG powder</td>
<td>Capsules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mixed spices</td>
</tr>
<tr>
<td>ETOH (occasional adult subject)</td>
<td>Wine, Beer, straight grain alcohol</td>
<td>Elemental liquid diet</td>
</tr>
</tbody>
</table>
HISTORY = FOOD ASSOCIATED SYMPTOM - NO FOOD SUSPECTED

ELIMINATION DIET

Symptoms Resolve

Regular Diet

No Symptoms Recur

Problems Resolved

Long List of Foods Tolerated

Symptoms Persist

Diet Not the Problem

Symptoms Recur

Elimination Diet Repeated

Symptoms Resolve

Add Foods Openly by Food Group

Short List of Food Associated With Symptoms

DBPCFC for Each Food
(May Use Skin Test First)
Food challenges in an office over time

From June 1999 through Nov 2013 we performed food 1254 challenges almost all in children.

These have been done in an office setting and almost all have been open challenges.
Results of 100 office challenges

- Patients 3 to 18 years of age (60% M)
- Positive challenges = 17
- Sensitized patients positive = 15 (88%)
- Non-sensitized pts positive = 2
- Of 83 negative challenges:
  - 52 (63%) sensitized to the food
  - 31 (37%) not sensitized (challenges in off due to risk)
Results of 100 office challenges (con’t)

Symptoms: GI, skin, respiratory
Severe symptoms: epinephrine required – 2 pts
  1 marked upper respiratory tract symptoms
  and urticaria during a baked milk challenge.
  1 vomiting, urticaria, cough, wheeze,
  pharyngeal pruritus.
Foods challenged: peanut, tree nuts (not Brazil nut) egg, baked egg, milk, baked milk, shrimp,
  scallops, lobster, soy, sesame, wheat.
Results of baked egg/baked milk challenges

- 26 baked egg challenges 8 positive (31%)
- Skin test range for positive challenges 3 mm to 15 mm
- sIgE to egg range for positive challenges 0.42 kU/l to 23 kU/l
- 34 baked milk challenges, 14 positive (41%)
- Skin test range for positive challenges 3 mm to 15 mm
- sIgE to milk range for positive challenges 0.35 kU/l to 24 kU/l
- All pos challenges had pos skin test, all but one positive challenge had detectable sIgE.
Suggested Procedure for home introduction of foods
(deemed safe by both parents and doctor)

- Both parents much be present (or 2 adults)
- Injectable epinephrine on the table (if prescribed)
- Begin with one small bite.
- Increase by a bite (or 2) every 20 to 30 minutes until a reasonable total portion has been consumed (or a reaction has occurred).
Suggested Procedure for home introduction of foods (con’t)

- If no reaction during the introduction phase watch closely for 24 hours and if no problem then begin introduction of the food into the diet regularly and in any acceptable form.

- If a reaction occurs treat appropriately (no Benadryl, if antihistamine is needed use Zyrtec [Cetirizine] in the recommended dose). If epinephrine used 911 must be called.
If there is doubt that a possible reaction is occurring, and it is felt that a trip to ED or urgent care is necessary then both parents (or 2 adults) must go! If the ED is not within a few minutes they should call 911. (If 911 is called from a cell phone, the location must be reported to the EMS.)
Never underestimate the power of the human mind of aggravate or alleviate the ills we suffer.
A few selected references

